Appendix B: Indicator Metadata

Terms Used in the Indicator Metadata Appendix

Indicator names are those presented in the text report of this.

Indicator type (status or trend) - Indicators are designated **status** if the indicator is supported by a single data point or study, a snapshot in time. Indicators are designated **trends** if there are at least three data points.

Indicator category. Indicators were assigned to one of two categories:

■ **Category 1**—The indicator has been peer reviewed and is supported by national level data coverage for more than one time period. The supporting data are comparable across the nation and are characterized by sound collection methodologies, data management systems, and quality assurance procedures.

■ **Category 2**—The indicator has been peer reviewed, but the supporting data are available only for part of the nation (e.g., multi-state regions or ecoregions), or the indicator has not been measured for more than one time period, or the not all the parameters of the indicator have been measured (e.g., data has been collected for birds, but not for plants or insects). The supporting data are comparable across the areas covered, and are characterized by sound collection methodologies, data management systems, and quality assurance procedures.

All category designations for the indicators and associated data are relative to the specific associated question.

Spatial coverage is scale and geographic information about where monitoring and sampling have taken place.

Temporal coverage is the time period in which the data has been collected and includes information about seasonality of collection activity where relevant.

Characterization of supporting data set(s) is descriptive information about the history of the database and its collection methodologies, data management systems, and quality assurance procedures.

Indicator source information, including **derivation** and **web sites**, are provided for readers who want additional information.

Chapter 1: Cleaner Air

Outdoor Air Quality

Indicator name: Number and percentage of days that metropolitan statistical areas (MSAs) have Air Quality Index (AQI) values greater than 100

Indicator type (status or trend): Trend

Indicator category (1 and 2): 2

Associated question: What is the quality of outdoor air in the United States?

Spatial coverage: National. Based on the measurements, EPA designates geographical areas of attainment (meeting standards) and nonattainment for specific criteria air pollutants.

Temporal coverage: 1988-2001.

Characterization of supporting data set(s): The National Air Monitoring Stations (NAMS) and the State and Local Air Monitoring Stations network measures air quality at 5,200 monitors operating at 3,000 sites across the country, mostly in urban areas. Measurements, taken on both a daily and continuous basis to assess both peak concentrations and overall trends, are reported in the Aerometric Information Retrieval Systems (AIRS). Trends are derived by averaging direct measurements from these monitoring stations on a yearly basis. Not all sites monitor all of the six criteria air pollutants. The Air Quality System (AQS) database contains measurements of criteria air pollutant concentrations in the 50 United States, plus the District of Columbia, Puerto Rico, and the Virgin Islands.

EPA uses the AQI for five major air pollutants regulated by the Clean Air Act (CAA): ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. In large metropolitan areas (more than 350,000 people), state and local agencies are required to report the AQI to the public daily. In 1976, EPA developed the Pollutant Standards Index (PSI), a consistent and easy to understand way of stating air pollutant concentrations and associated health implications. In June 2000, EPA updated the index and renamed it AQI. PSI and AQI are similar as they both focus on health risks of brief exposure to pollutants (a few hours or days); involve air pollutants regulated by the CAA (criteria pollutants); use the same method to calculate index values; and use an index value of 100 to represent pollutant concentration at the level of the national ambient standard set by EPA National Ambient Air Quality Standards (NAAQS). Beginning in 2000, the AQI included new features including a new health risk category, unhealthy for sensitive groups; two additional pollutants (ozone averaged over 8 hours and fine particulate matter less than 2.5 micrometers in size ($PM_{2.5}$); and a specific color associated with each of the health risk categories.

Indicator derivation (project, program, organization, report): For 1988 through 1991, data were drawn from U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. *National Air Quality and Emissions Trends Report,* 1997. Table A-15. EPA 454-R-98-016. Research Triangle Park, NC: EPA. December, 1998. For 1992 through 2001, data were drawn from U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Air trends: Metropolitan area trends, Table A-17. 2001. (February 25, 2003; *http://www.epa.gov/airtrends/metro.html*).

Web sites: *AIRS and AQS*
http://www.epa.gov/ttnairs1/airsaqs/index.htm;
1997 air quality trends report
http://www.epa.gov/oar/aqtrnd97/tables.html;
2000 air quality trends tables
http://www.epa.gov/airtrends/metro.html/;
AQI background
http://www.epa.gov/airnow/aqibroch/

Indicator name: Number of people living in areas with air quality levels above the National Ambient Air Quality Standards (NAAQS) for particulate matter (PM) and ozone

Indicator type (status or trend): Trend

Indicator category (1 and 2): 1

Associated question: How many people are living in areas with particulate matter and ozone levels above the National Ambient Air Quality Standards (NAAQS)?

Spatial coverage: National. Based on the measurements, EPA designates geographical areas of attainment (meeting standards) and nonattainment for specific criteria air pollutants.

Temporal coverage: 2001

Characterization of supporting data set(s): The National Air Monitoring Stations (NAMS) and the State and Local Air Monitoring Stations (SLAMS) network measure air quality at 5,200 monitors operating at 3,000 sites across the country, mostly in urban areas. Measurements, taken on both a daily and continuous basis to assess both peak concentrations and overall trends, are reported in the Aerometric Information Retrieval Systems (AIRS). Trends are derived by averaging direct measurements from these monitoring stations on a yearly basis. Not all sites monitor all of the six criteria air pollutants.

Indicator derivation (project, program, organization, report): Aerometric Information Retrieval System (AIRS), the repository of data collected from the NAMS and the SLAMS is reported in U.S. Environmental Protection Agency, *Latest Findings on National Air Quality: 2001 Status and Trends,* EPA 454-K-02-001, Washington, DC: EPA., Office of Air Quality and Standards, September 2002.

Web sites: *AIRS and AQS*
http://www.epa.gov/ttnairs1/airsaqs/index.htm;
Air quality trends report http://www.epa.gov/oar/aqtrnd01/

Indicator name: Ambient concentrations of particulate matter (PM$_{2.5}$ and PM$_{10}$)

Indicator type (status or trend): Status

Indicator category (1 and 2): 1

Associated question: What are the concentrations of some criteria air pollutants: PM$_{2.5}$, PM$_{10}$, ozone, and lead?

Spatial coverage: National. Based on the measurements, EPA designates geographical areas of attainment (meeting standards) and nonattainment for specific criteria air pollutants.

Temporal coverage: 1982-2001

Characterization of supporting data set(s): The National Air Monitoring Stations (NAMS) and the State and Local Air Monitoring Stations (SLAMS) network measure air quality at 5,200 monitors operating at 3,000 sites across the country, mostly in urban areas. Measurements, taken on both a daily and continuous basis to assess both peak concentrations and overall trends, are reported in the Aerometric Information Retrieval Systems (AIRS). Trends are derived by averaging direct measurements from these monitoring stations on a yearly basis. Not all sites monitor all of the six criteria air pollutants. In 1999, EPA and its state, tribal, and local air pollution control agency partners deployed a monitoring network to begin measuring PM$_{2.5}$ concentrations nationwide. The PM$_{2.5}$ data presents was drawn from AIRS as of July 8, 2002. 770 sites have sufficient PM10 to assess trends from 1992-2001.

Indicator derivation (project, program, organization, report): Aerometric Information Retrieval System (AIRS), the repository of data collected from the NAMS and the SLAMS is reported in U.S. Environmental Protection Agency, *Latest Findings on National Air Quality: 2001 Status and Trends,* EPA 454-K-02-001, Washington, DC: EPA., Office of Air Quality and Standards, September 2002.

Web sites: *AIRS and AQS*
http://www.epa.gov/ttnairs1/airsaqs/index.htm;
Air quality trends report http://www.epa.gov/oar/aqtrnd01/

Indicator name: Ambient concentrations of ozone, 8-hour and 1-hour

Indicator type (status or trend): Status

Indicator category (1 and 2): 1

Associated question: What are the concentrations of some criteria air pollutants: PM$_{2.5}$, PM$_{10}$, ozone, and lead?

Spatial coverage: National. Based on the measurements, EPA designates geographical areas of attainment (meeting standards) and nonattainment for specific criteria air pollutants.

Temporal coverage: 1982-2001

Characterization of supporting data set(s): The National Air Monitoring Stations (NAMS) and the State and Local Air Monitoring Stations (SLAMS) network measure air quality at 5,200 monitors operating at 3,000 sites across the country, mostly in urban areas. Measurements, taken on both a daily and continuous basis to assess both peak concentrations and overall trends, are reported in the Aerometric Information Retrieval Systems (AIRS). Trends are derived by averaging direct measurements from these monitoring stations on a yearly basis. Not all sites monitor all of the six criteria air pollutants. 379 sites have sufficient data to assess trends from 1992-2001 for both 8-hour and 1-hour measurements.

Indicator derivation (project, program, organization, report): Aerometric Information Retrieval System (AIRS), the repository of data collected from the NAMS and the SLAMS is reported in U.S. Environmental Protection Agency, *Latest Findings on National Air Quality: 2001 Status and Trends,* EPA 454-K-02-001, Washington, DC: EPA., Office of Air Quality and Standards, September 2002.

Web sites: *AIRS and AQS*
http://www.epa.gov/ttnairs1/airsaqs/index.htm;
Air quality trends report http://www.epa.gov/oar/aqtrnd01/

Indicator name: Ambient concentrations of lead

Indicator type (status or trend): Trend

Indicator category (1 and 2): 1

Associated question: What are the concentrations of some criteria air pollutants: PM2.5, PM10, ozone, and lead?

Spatial coverage: National. Based on the measurements, EPA designates geographical areas of attainment (meeting standards) and nonattainment for specific criteria air pollutants.

Temporal coverage: 1982-2001

Characterization of supporting data set(s): The National Air Monitoring Stations (NAMS) and the State and Local Air Monitoring Stations (SLAMS) network measure air quality at 5,200 monitors operating at 3,000 sites across the country, mostly in urban areas. Measurements, taken on both a daily and continuous basis to assess both peak concentrations and overall trends, are reported in the Aerometric Information Retrieval Systems (AIRS). Trends are derived by averaging direct measurements from these monitoring stations on a yearly basis. Not all sites monitor all of the six criteria air pollutants. EPA has over 200 lead monitoring sites for lead nationally in addition to special purpose monitors near smelters and other lead emitters. The lead trend is based on 39 monitors that have a full 20 years of complete data.

Indicator derivation (project, program, organization, report): Aerometric Information Retrieval System (AIRS), the repository of data collected from the NAMS and the SLAMS is reported in U.S. Environmental Protection Agency, *Latest Findings on National Air Quality: 2001 Status and Trends*, EPA 454-K-02-001, Washington, DC: EPA., Office of Air Quality and Standards, September 2002.

Web sites: *AIRS and AQS*
http://www.epa.gov/ttnairs1/airsaqs/index.htm;
http://www.epa.gov/oar/aqtrnd01/

Indicator name: Visibility

Indicator type (status or trend): Trend

Indicator category (1 and 2): 1

Associated question: What are the impacts of air pollution on visibility in national parks and other protected lands?

Spatial coverage: National. 30 sampling sites located in national parks and wilderness areas through 1999; 110 sites after 2000 in the monitoring network with an additional 20 sites using the monitoring protocol. Applicable to 156 Class I areas, mostly national parks and wilderness areas in the eastern and western U.S.

Temporal coverage: 1992-1999 and 1990-1999

Characterization of supporting data set(s): Data are presented by mean visual range as measured in kilometers respectively by worst, mid-range, and best visibility. The Interagency Monitoring of Protected Visual Environments (IMPROVE) network was established in 1987 as a cooperative effort among EPA, states, the National Park Service, the U.S. Forest Service, the Bureau of Land Management, and the U.S. Fish and Wildlife Service. Data are collected and analyzed from this network to determine the type of pollutants primarily responsible for reduced visibility and to track progress toward the Clean Air Act's national goal.

Indicator derivation (project, program, organization, report): U.S. Environmental Protection Agency, *Latest Findings on National Air Quality: 2001 Status and Trends*, EPA 454-K-02-001, Washington, DC: EPA., Office of Air Quality and Standards, September 2002.

Web site: *Air quality trends report*
http://www.epa.gov/oar/aqtrnd01/

Indicator name: Ambient concentrations of selected air toxics

Indicator type (status or trend): Trend

Indicator category (1 and 2): 2

Associated question: What are the concentrations of toxic air pollutants in ambient air?

Spatial coverage: National, but no formal monitoring network in place limiting information.

Temporal coverage: 1994-2000

Characterization of supporting data set(s): Selected air toxics only, not all 188 identified in the Clean Air Act (CAA). Ambient concentrations are based on annual averages from the reporting sites. EPA and the states do not maintain an extensive nationwide monitoring network for air toxics as they do for the criteria air pollutants. While EPA, states, tribes, and local air regulatory agencies collect monitoring data for a number of toxic air pollutants, both the chemicals monitored and the geographic coverage of the monitors vary from state to state. Measurements of benzene were taken from 95 urban monitoring sites around the country. These urban areas generally have higher levels of benzene than other areas of the country.

Indicator derivation (project, program, organization, report): The data come from a combination of several monitoring networks, including: Photochemical Assessment Monitoring Stations Program; Urban Air Toxics Monitoring Program; Non-Methane Organic Compound Monitoring Program; Interagency Monitoring of Protected Visual Environments (IMPROVE) Network. Reported in U.S. Environmental Protection Agency, *Latest Findings on National Air Quality: 2001 Status and Trends*, EPA 454-K-02- 001, Washington, DC: EPA., Office of Air Quality and Standards, September 2002.

Web site: *Air quality trends report*
http://www.epa.gov/oar/aqtrnd01/

Indicator name: Emissions: particulate matter ($PM_{2.5}$ and PM_{10}), sulfur dioxide, nitrogen oxides, and volatile organic compounds

Indicator type (status or trend): Trend

Indicator category (1 and 2): 2

Associated question: What are contributors to particulate matter, ozone, and lead in ambient air?

Spatial coverage: National

Temporal coverage: 1992-2001

Characterization of supporting data set(s): Actual emissions data are not presented and estimates are used. EPA estimates nationwide emissions of ambient pollutants and their precursors based on actual monitored readings or engineering calculations of the amounts and types of pollutants emitted by vehicles, factories, and other sources. Emission estimates are based on many factors, including the level of industrial activity, technology developments, fuel consumption, vehicle miles traveled, and other activities that cause air pollution (EPA, OAQPS, September 2002). Consistent estimation methods have been developed to provide trend data. Estimation is particularly necessary for mobile sources and area-wide sources. The methodology for estimating emissions is continually reviewed and is subject to revision. EPA is currently conducting such an evaluation of emissions data, and emissions estimates may be updated. Trend data prior to revisions must be considered in the context of those changes.

Emission estimates also reflect changes in air pollution regulations and installation of emission controls.

Indicator derivation (project, program, organization, report): The National Emissions Inventory (NEI) for Criteria and Hazardous Air Pollutants (HAPs) is a composite of many data sources reported in U.S. Environmental Protection Agency, *Latest Findings on National Air Quality: 2001 Status and Trends*, EPA 454-K-02-001, Washington, DC: EPA., Office of Air Quality and Standards, September 2002. In the NEI, EPA divides emissions into four types of sectors: 1) major (large industrial) sources; 2) area and other sources, which include smaller industrial sources like small dry cleaners and gasoline stations, as well as natural sources like wildfires; 3) onroad mobile sources, including highway vehicles; and 4) nonroad mobile sources like aircraft, locomotives, and construction equipment (EPA, OAQPS, September 2002).

Web site: *Air quality trends report*
http://www.epa.gov/oar/aqtrnd01/

Indicator name: Lead emissions

Indicator type (status or trend): Trend

Indicator category (1 and 2): 2

Associated question: What are contributors to particulate matter, ozone, and lead in ambient air?

Spatial coverage: National

Temporal coverage: 1982-2001

Characterization of supporting data set(s): EPA estimates nation-wide emissions of ambient pollutants and their precursors based on actual monitored readings or engineering calculations of the amounts and types of pollutants emitted by vehicles, factories, and other sources. Emission estimates are based on many factors, including the level of industrial activity, technology developments, fuel consumption, vehicle miles traveled, and other activities that cause air pollution (EPA, OAQPS, September 2002). Consistent estimation methods have been developed to provide trend data. Estimation is particularly necessary for mobile sources and area-wide sources. The methodology for estimating emissions is continually reviewed and is subject to revision. EPA is currently conducting such an evaluation of emissions data, and emissions estimates may be updated. Trend data prior to revisions must be considered in the context of those changes. Emission estimates also reflect changes in air pollution regulations and installation of emission controls.

Indicator derivation (project, program, organization, report): The National Emissions Inventory (NEI) for Criteria and Hazardous Air Pollutants (HAPs) is a composite of many data sources reported in U.S. Environmental Protection Agency, *Latest Findings on National Air Quality: 2001 Status and Trends*, EPA 454-K-02-001, Washington, DC: EPA., Office of Air Quality and Standards, September 2002.

Web site: *Air quality trends report*
http://www.epa.gov/oar/aqtrnd01/

Indicator name: Air toxics emissions

Indicator type (status or trend): Trend

Indicator category (1 and 2): 2

Associated question: What are contributors to toxic air pollutants in ambient air?

Spatial coverage: National

Temporal coverage: 1990-1993, 1996

Characterization of supporting data set(s): Hazardous air pollutant estimates are currently available for 1990-1993 (a mix of years depending on data availability on various source types) and 1996. EPA compiles an air toxics inventory as part of the National Emissions Inventory (NEI, formerly the National Toxics Inventory) to estimate and track national emissions trends for the 188 toxic air pollutants regulated under the CAA. In the NEI, EPA divides emissions into four types of sectors: 1) major (large industrial) sources; 2) area and other sources, which include smaller industrial sources like small dry cleaners and gasoline stations, as well as natural sources like wildfires; 3) onroad mobile sources, including highway vehicles; and 4) nonroad mobile sources like aircraft, locomotives, and construction equipment. The data presented are based on the data in the NEI (EPA, OAQPS, September 2002).

Indicator derivation (project, program, organization, report): The NEI for Criteria and Hazardous Air Pollutants (HAPs) is a composite of many data sources reported in U.S. Environmental Protection Agency, *Latest Findings on National Air Quality: 2001 Status and Trends*, EPA 454-K-02-001, Washington, DC: EPA., Office of Air Quality and Standards, September 2002.

Web site: *Air quality trends report*
http://www.epa.gov/oar/aqtrnd01/

Acid Deposition

Indicator name: Deposition: wet sulfate and wet nitrogen

Indicator type (status or trend): Status comparison

Indicator category (1 and 2): 2

Associated question: What are the deposition rates of pollutants that cause acid rain?

Spatial coverage: NADP/NTN consists of over 250 sites in the continental U.S., Alaska, Puerto Rico, and the Virgin Islands.

Temporal coverage: 1989-1991, 1999-2001

Characterization of supporting data set(s): 1) The data is collected by uniform methods/protocol under the National Atmospheric Deposition Program (NADP)/National Trends Network (NTN) and the Clean Air Status and Trends Network (CASTNet). The NADP is a cooperative program among federal and state agencies, universities, electric utilities, and other industries that has measured precipitation chemistry in the U.S. since 1978. The NADP/NTN is a nationwide network of precipitation monitoring sites designed to measure regional levels of atmospheric deposition. The NADP/NTN measures wet acid deposition that occurs in rain, snow, or sleet) weekly at about 250 monitoring stations throughout the U.S. The data are subject to strict quality assurance and completeness screening in the field, in the laboratory, and during analysis. 2) Presented total sulfur and total nitrogen data are derived from CASTNet, a nationwide network of over 70 sites concentrated in the eastern continental U.S. that measure ambient air concentrations of pollutants, including ozone. CASTNet has not yet completed its expansion into the Great Plains and western states. CASTNet also measures dry deposition (the process through which particles and gases are deposited in the absence of precipitation) of acidic compounds. CASTNet data are also subject to strict quality assurance and completeness criteria (EPA, OAR, November 2002).

Indicator derivation (project, program, organization, report): NADP/NTN and CASTNet data are reported in U.S. Environmental Protection Agency, *EPA Acid Rain Program: 2001 Progress Report*, EPA 430-R-02-009, Washington, DC: EPA, Office of Air and Radiation, November, 2002.

Web site: *NADP/NTN Data Access* http://nadp.sws.uiuc.edu/

Indicator name: Emissions (utility): sulfur dioxide and nitrogen oxides

Indicator type (status or trend): Trend

Indicator category (1 and 2): 2

Associated question: What are the emissions of pollutants that form acid rain?

Spatial coverage: Over 2000 facilities nationally.

Temporal coverage: 1980, 1985, 1990, 1995, 2000, 2001

Characterization of supporting data set(s): Data collected by regulated facilities using certified continuous emissions monitors or equivalent, beginning in 1994-95 with quarterly and annual totals tabulated for each facility and aggregated for plants, states, and the U.S.

Indicator derivation (project, program, organization, report): U.S. Environmental Protection Agency. *EPA Acid Rain Program: 2001 Progress Report*, EPA 430-R-02-009. Washington, DC: U.S. Environmental Protection Agency, Office of Air and Radiation, November 2002. Appendix A: Acid Rain Program - Year 2001 SO_2 Allowance Holdings and Deductions. (April 8, 2003; *http://www.epa.gov/airmarkets/cmprpt/arp01/appendixa.pdf*) and Appendix B1: 2001 Compliance Results for NO_X Affected Units. (April 8, 2003; *http://www.epa.gov/airmarkets/cmprpt/arp01/ appendixb1.pdf*).
Web site: http://www.epa.gov/airmarkets/emissions/index.html

Indoor Air Quality

Indicator name: U.S. homes above EPA's radon action levels

Indicator type (status or trend): Status

Indicator category (1 and 2): 2

Associated question: What is the quality of the air in buildings in the United States?

Spatial coverage: National

Temporal coverage: 1989-1990

Characterization of supporting data set(s): The National Radon Residential Study of 1989-1990 was a survey of the nation's housing that estimated that 6 percent of U.S. homes (5.8 million in 1990) had an annual average radon level greater than 4 picocuries per liter (pCi/L) in indoor air. Data viability is limited given its age and subsequent changes as a result of education efforts and new housing stock.

Indicator derivation (project, program, organization, report): U.S. Environmental Protection Agency. *National Residential Radon Survey: Summary Report*, EPA 402-R-92-011. Washington, DC: EPA, Office of Air and Radiation, October 1992.

Web site: Report is not available online.

Indicator name: Percentage of homes where young children are exposed to environmental tobacco smoke

Indicator type (status or trend): Status

Indicator category (1 and 2): 2

Associated question: What is the quality of the air in buildings in the United States?

Spatial coverage: National

Temporal coverage: The National Center for Health Statistics (NCHS), National Health Interview Survey (NHIS) has been conducted continuously since 1957, the content of the survey has been updated about every 10-15 years. In 1996 a substantially revised NHIS content began field testing. This new questionnaire, described in detail below, began in 1997 and improves the ability of the NHIS to provide important health information. 1998 data is cited.

Characterization of supporting data set(s): The NHIS is a continuous nationwide survey in which data are collected through personal household interviews. Self-reported information is obtained on personal and demographic characteristics, illnesses, injuries, impairments, chronic conditions, utilization of health resources, and other health topics. The sample scheduled for each week is representative of the target population, and the weekly samples are additive over time. Response rates for special health topics (supplements) have generally been lower. Because of the extensive redesign of the questionnaire in 1997 and introduction of the computer-assisted personal interviewing (CAPI) method of data collection, data from 1997 and later years may not be comparable with earlier years. The indicator numerator was the number of children 6 years and under living in households with a resident who smoked inside the home 4 or more days each week. The denominator was the number of households with children ages 6 years and under.

Indicator source (project, program, organization, report): U.S. Department of Health and Human Services, National Center for Health Statistics. *Healthy People 2000 Final Review*, DHHS Publication No. 01-0256. Hyattsville, MD: Public Health Service, October 2001.

Web site: http://www.cdc.gov/nchs/data/hp2000/hp2k01.pdf

Stratospheric Ozone

Indicator name: Ozone levels over North America

Indicator type (status or trend): Status (two separate data points, not a trend)

Indicator category (1 and 2): 1

Associated question: What is the trends in the Earth's ozone layer?

Spatial coverage: Daily images of North America.

Temporal coverage: Begun in 1978, ongoing with a gap in coverage from December 1994 through June 1996.

Characterization of supporting data set(s): High-resolution spectrographic images taken daily from National Aeronautics and Space Administration (NASA) satellite platforms.

Indicator derivation (project, program, organization, report): National Aeronautics and Space Administration. Ozone Levels Over North America - NIMBUS-7/TOMS. March 1979 and March 1994. (January 24, 2003; *http://epa.gov/ozone/science/glob_dep.html*).

Web site: The graphic images referenced by the indicator can be found at http://www.epa.gov.ozone/science/glob_dep.html

Indicator name: Worldwide and U.S. production of ozone-depleting substances

Indicator type (status or trend): Trend

Indicator category (1 and 2): 2

Associated question: What are causing changes to the ozone layer?

Spatial coverage: Global and national

Temporal coverage: Worldwide1986 and 1999; U.S.1958-1993

Characterization of supporting data set(s): Global—The present report contains additional and updated data on the production and consumption of ozone-depleting substances (ODS), as reported to the United Nations Secretariat during the period 1986-2000, by 167 of the 183 parties to the Montreal Protocol on Substances that

Deplete the Ozone Layer. The Secretariat has arranged the data provided by the Parties into the groups for which control measures are prescribed in the protocol. To calculate the figures for each group, the quantities in metric tons reported by the parties for each substance of the group were multiplied by the ozone-depleting potential (ODP) of that substance and added together. All the data in this report is therefore presented in ODP tons. National–Methodology uncertain.

Indicator derivation (project, program, organization, report):
Global: United Nations Environment Programme. *Production and Consumption of Ozone Depleting Substances under the Montreal Protocol 1986-2000,* Nairobi, Kenya: United Nations Environment Programme, Secretariat for The Vienna Convention for the Protection of the Ozone Layer and The Montreal Protocol on Substances that Deplete the Ozone Layer, April 2002. National: Historical data (1958-1993) is drawn from the report U.S. International Trade Commission. *1993. Synthetic Organic Chemicals; U.S. Production and Sales,* Washington DC: Government Printing Office, 1994.

Web site: *EPA report* http://www.epa.gov/globalwarming/
publications/emissions/index.html;
U.S. ITC report http://www.epa.gov/ozone/science/
indicat/index.html

Indicator name: Concentrations of ozone-depleting substances (equivalent effective chlorine)

Indicator type (status or trend): Trend

Indicator category (1 and 2): 2

Associated question: What are causing changes to the ozone layer?

Spatial coverage: Global

Temporal coverage: 1992-2002

Characterization of supporting data set(s): Approximately 250 scientists from many countries of the developed and developing world participated in the 2002 assessment as lead authors, coauthors, contributors, and reviewers.

Indicator derivation (project, program, organization, report):
1) Scientific Assessment Panel of the Montreal Protocol on Substances that Deplete the Ozone Layer. *Scientific Assessment of Ozone Depletion: 2002, Executive Summary,* Report No. 47. Geneva, Switzerland: World Meteorological Organization, Global Ozone Research and Monitoring Project, 2003. 2) Montzka, S.A., J.H. Butler, J.W. Elkins, T.M. Thompson, A.D. Clarke, and L.T. Lock. Present and future trends in the atmospheric burden of ozone- depleting halogens. *Nature* 398: 690-694 (1999). 3) National Oceanic and Atmospheric Administration, Climate Monitoring & Diagnostics Laboratory. Halocarbons and other Atmospheric Trace Species (HATS). 2002. March 18, 2003;
http://www.cmdl.noaa.gov/hats/graphs/graphs.html).

Web site: WMO report http://www.unep.ch/ozone/sap2002.shtml;
Global Equivalent Effective Chlorine graphic
http://www.cmdl.noaa.gov/hats/graphs/graphs

Chapter 2: Purer Water

Waters and Watersheds

Indicator name: Altered fresh water ecosystems

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What is the condition of fresh surface waters and watersheds in the U.S.?

Spatial coverage: Lower 48 states. Applies to rivers, streams, lakes, ponds and reservoirs, and does not account for all types of alteration.

Temporal coverage: 1992

Characterization of supporting data set(s): 1) The U.S. Geological Survey's National Hydrography Dataset (NHD) and the Multi-Resolution Land Characterization (MRLC) Consortium's National Land Cover Database (NLCD) were used to identify alteration. NLCD uses remote-sensed image data. 2) Data on altered wetlands are available through the U.S. Fish and Wildlife Service's (USFWS) National Wetlands Inventory (NWI). NWI counts all wetlands, lakes, reservoirs, and ponds regardless of land ownership, but recognizes only wetlands that are at least 3 acres, and ponds that are at least 1 acre. At present, these data are not available in electronic form for the entire U.S.

Indicator derivation (project, program, organization, report): 1) MRLC Consortium's NLCD and the USGS's NHD, processed by U.S. Environmental Protection Agency's Office of Research and Development, National Exposure Research Laboratory, Environmental Sciences Division plus the 2) USFWS's NWI. Presented in *The State of the Nation's Ecosystems*, pages 140 and 247 (The Heinz Center, 2002).

Web site: *NHD* http://nhd.usgs.gov/; *NLCD* http://www.epa.gov/mrlc/about.html; *NWI* http://www.nwi.fws.gov

Indicator name: Lake Trophic State Index

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What is the condition of fresh surface waters and watersheds in the U.S.?

Spatial coverage: Northeast United States

Temporal coverage: 1991-1994

Characterization of supporting data set(s): The EPA Environmental Monitoring and Assessment (EMAP) program conducted variable probability sampling on 344 lakes throughout the northeastern United States. The EMAP trophic state characterization is based primarily on the total phosphorus indicator. Descriptions of total nitrogen, chlorophyll-a, total suspended solids, and Secchi disk transparency were used to support the total phosphorus characterization.

Indicator derivation (project, program, organization, report): Peterson, Spencer A., David P. Larsen, Steven G. Paulsen, and N. Scott Urquhart. Regional Lake Trophic Patterns in the Northeastern United States: Three Approaches. *Environmental Management* 22 (5): 789-801 (1999).

Web site: Full article not available on noncommercial website.

Indicator name: Wetland extent and change

Indicator type (status or trend): Status and trends

Indicator category (1 or 2): 1

Associated question: What is the extent and condition of wetlands?

Spatial coverage: Lower 48 states

Temporal coverage: 1950s to 1997 (1954-1974, 1974-1983, 1986-1997)

Characterization of supporting data set(s): An interagency group of statisticians developed the design for the U.S. Fish and Wildlife Service's (USFWS) national status and trends study. The basic sampling design and study objectives have remained constant for each wetland status and trends report. The study design consists of 4,375 randomly selected sample plots (4-square-miles in area) that are examined and characterized using aerial imagery provided by the National Aerial Photography Program in combination with field verification to determine wetland change. Estimates of change in wetlands were made over a specific time period. To make the three studies used comparable, the USFWS authors of the 2000 report adjusted the estimate of wetland area for the mid-1980s in the 1991 report to be in the same statistical range. Other factors contributing to this adjustment were corrections to the wetland data set, and improved data capture and measurement techniques (Dahl, 2000).

Indicator derivation (project, program, organization, report): 1) Dahl, T.E. *Status and Trends of Wetlands in the Conterminous United States 1986 to 1997*, Washington DC: U.S. Department of the Interior, U.S. Fish and Wildlife Service, 2000. 2) Frayer, W.E., T.J. Monahan, D.C. Bowden, and F.A. Graybill. *Status and Trends of Wetlands and Deepwater Habitats in the Conterminous United States, 1950's to 1970's*, Ft. Collins, CO: Colorado State University, 1983. 3) Dahl, T.E., and C.E. Johnson. *Status and Trends of Wetlands in the Conterminous United States, Mid-1970's to Mid-1980's,* Washington DC: U.S. Department of the Interior, U.S. Fish and Wildlife Service, 1991.

Web site: *Dahl, 2000*
http://wetlands.fws.gov/bha/SandT/SandTReport.html

Indicator name: Sources of wetland change/loss

Indicator type (status or trend): Status and trend

Indicator category (1 or 2): 2

Associated question: What is the extent and condition of wetlands?

Spatial coverage: Non-federal lands, lower 48 states, Puerto Rico and the Virgin Islands

Temporal coverage: U.S. Department of Agriculture (USDA), National Resources Inventory (NRI) data are collected every five years, 1982-1997.

Characterization of supporting data set(s): Data collected for the 1997 NRI were based on a statistical design to sample 800,000 sample points, using photo-interpretation and other remote sensing methods and standards. Data gatherers utilized a variety of ancillary materials; extensive use was made of USDA field office records, information provided by local Natural Resources Conservation Service (NRCS) field personnel, soil survey and wetland inventory maps and reports, and tables and technical guides developed by local field office staffs.

Indicator derivation (project, program, organization, report): U.S. Department of Agriculture. *Summary Report: 1997 National Resources Inventory (Revised December 2000)*, Washington, DC: Natural Resources Conservation Service and Ames, Iowa: Iowa State University, Statistical Laboratory, 2000.

Web site:
http://www.nrcs.usda.gov/technical/NRI/1997/summary_report/table16.html

Indicator name: Water clarity in coastal waters

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What is the condition of coastal waters?

Spatial coverage: U.S. east coast south of Cape Cod, Gulf of Mexico, and west coast.

Temporal coverage: 1990-1997 variable by region

Characterization of supporting data set(s): Data collected using a statistically based random design from estuaries by transmissometer at 1 meter below the water surface.

Geographic location/applicability: U.S. east coast south of Cape Cod, Gulf of Mexico, and west coast

Indicator derivation (project, program, organization, report): U.S. Environmental Protection Agency (EPA) Environmental Monitoring and Assessment Program (EMAP) Estuaries database as presented in U.S. Environmental Protection Agency. *National Coastal Condition Report*, EPA 620-R-01-005. Washington DC: U.S. Environmental Protection Agency, Office of Research and Development and Office of Water, September 2001.

Web site: *EMAP data*
http://www.epa.gov/emap/html/dataI/estuary/data/index.html;
NCCR http://epa.gov/owow/oceans/nccr/downloads.html

Indicator name: Dissolved oxygen in coastal waters

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What is the condition of coastal waters?

Spatial coverage: U.S. east coast south of Cape Cod, Gulf of Mexico, and west coast

Temporal coverage: 1990-1997 variable by region

Characterization of supporting data set(s): Data collected using a statistically-based random design from estuaries by point-in-time or continuously recording dissolved oxygen meter a 1 meter above the bottom.

Indicator derivation (project, program, organization, report): U.S. Environmental Protection Agency (EPA) Environmental Monitoring and Assessment Program (EMAP) Estuaries database as presented in U.S. Environmental Protection Agency. *National Coastal Condition Report*, EPA 620-R-01-005. Washington DC: EPA, Office of Research and Development and Office of Water, September 2001.

Web site: *EMAP data*
http://www.epa.gov/emap/html/dataI/estuary/data/index.html;
NCCR http://epa.gov/owow/oceans/nccr/downloads.html

Indicator name: Total organic carbon in sediments

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What is the condition of coastal waters?

Spatial coverage: Mid-Atlantic estuaries

Temporal coverage: 1997-1998

Characterization of supporting data set(s): The EPA Mid-Atlantic Integrated Assessment (MAIA) Estuaries Summary Database contains water quality, sediment, benthic community, and fish data collected by several partners in MAIA Region estuaries in 1997 and 1998. The MAIA program conducted regular fish surveys during the summer of 1998 to characterize the structure and health of the fish communi-

ties. The stations sampled were selected according to a probabilistic design. These stations were not identical with the stat ons sampled for water and sediment quality analyses conducted primarily in 1997; therefore, it is not possible to directly compare these different analyses station by station. However, it is statisticallyvalid to compare results among *classes* of estuaries, (e.g., large versus small estuaries, Delaware Estuary versus Chesapeake Estuary).

Indicator source (project, program, organization, report): U.S. Environmental Protection Agency. *Mid- Atlantic Integrated Assessment, MAIA - Estuaries 1997-98, Summary Report*, EPA 620-R-02-003. Narragansett, RI: EPA, Office of Research and Development, Atlantic Ecology Division, May 2003.

Web site: *MAIA Estuaries data*
http://www.epa.gov/emap/maia/html/data/estuary/9798/xport.html

Indicator name: Chlorophyll concentrations

Indicator type (status or trend): Trend

Indicator category: 2

Associated question: What is the condition of coastal waters?

Spatial coverage: National in scope, selected ocean regions

Temporal coverage: 1998-2000

Characterization of supporting data set(s): Data from the National Aeronautical and Space Administration's (NASA) Sea viewing Wide Field-of-view Sensor (Sea WiFS) were analyzed for nine ocean regions by the National Ocean Service (NOS), National Oceanographic and Atmospheric Administration (NOAA). Reflectance, or light reflected from the sea surface is used to estimate chlorophyll concentrations at the surface using a series of assumptions accepted by the scientific community (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): NASA Sea WiFS data analyzed by the NOS. Presented in *The State of the Nation's Ecosystems*, pages 80 and 226 (The Heinz Center, 2002).

Web site: http://seawifs.gsfc.nasa.gov

Indicator name: Percent urban land cover in riparian areas

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: National, excluding Alaska

Temporal coverage: NLCD, 1992 imagery; C-CAP, mid-1990s imagery; NHD, 1999.

Characterization of supporting data set(s): Riparian zones defined as 30-meter buffer around streams, extent and locations extracted from the National Hydrography Dataset (NHD). Urban land cover defined as sum of low-intensity residential, high-intensity residential, and commercial/industrial/transportation land cover types in National Land Cover Database (NLCD) and sum of high-intensity developed and low- intensity developed land cover types in the Coastal Change Analysis Program (C-CAP). Cover identified by aerial imagery.

Indicator derivation (project, program, organization, report): NHD, NLCD, and C-CAP data processed by the U.S. Environmental Protection Agency, Office of Research and Development, National Exposure Research Laboratory, Environmental Sciences Division.

Web sites: *NLCD* http://www.epa.gov/mrlc/about.html;
C-CAP http://www.csc.noaa.gov/crs/lca/index.html;
NHD http://nhd.usgs.gov/index.html;
HUC http://water.usgs.gov/GIS/huc.html

Indicator name: Agricultural lands in riparian areas

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: National, excluding Alaska

Temporal coverage: NLCD, 1992 imagery; C-CAP, mid-1990s imagery; NHD, 1999.

Characterization of supporting data set(s): Riparian zones defined as 30-meter buffer around streams, extent and locations extracted from the National Hydrography Dataset (NHD). Total agriculture is defined as the sum of row crops and pasture land cover types in the National Land Cover Database (NLCD) and as the amount of cultivated land in the Coastal Change Analysis Program (C-CAP). Cover identified by aerial imagery.

Indicator derivation (project, program, organization, report): NHD, NLCD, and C-CAP data processed by U.S. EPA National Exposure Research Laboratory, Environmental Sciences Division.

Web sites: *NLCD* http://www.epa.gov/mrlc/about.html;
C-CAP http://www.csc.noaa.gov/crs/lca/index.html;
NHD http://nhd.usgs.gov/index.html;
HUC http://water.usgs.gov/GIS/huc.html

Indicator name: Population density in coastal areas

Indicator type (status or trend): Trend

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: National

Temporal coverage: 1790 to 1994 population data

Characterization of supporting data set(s): Various Bureau of the Census publications were used in preparing the article. NPA Data Services, Inc. provided the population projection data for this paper. The Bureau of the Census, U.S. Department of the Interior, provided historical information on coastal counties.

Indicator source (project, program, organization, report): Culliton, Thomas J. "Population: Distribution, Density and Growth." In NOAA's *State of the Coast Report*. Silver Spring, MD: National Oceanic and Atmospheric Administration. 1998. (February 2003; *http://state-of- coast.noaa.gov/bulletins/html/pop_01/pop.html*).

Web site: http://state-of-coast.noaa.gov/bulletins/html/pop_01/pop.html

Indicator name: Changing stream flows

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are pressures to water quality?

Spatial coverage: National

Temporal coverage: Since end of the 19th century focusing on period from 1970s to 1990s

Characterization of supporting data set(s): Data are from the U.S. Geological Survey (USGS) stream gauge network using standard USGS protocols. Data are available in the form of daily streamflow values reported as the average volume of water per second over a 24-hour period. Gauge placement by the USGS is not a random process as gauges are generally placed on larger, perennial streams and rivers, and changes seen in these larger systems may differ from those seen in smaller streams and rivers (The Heinz Center, 2002).

Indicator source (project, program, organization, report): USGS stream gauging network. Presented in *The State of the Nation's Ecosystems*, pages 142 and 249 (The Heinz Center, 2002).

Web site: http://www.water.usgs.gov.nwis.discharge

Indicator name: Number/duration of dry stream flow periods in grassland/shrublands

Indicator type (status or trend): Trend

Indicator category: 2

Associated question: What are pressures to water quality?

Spatial coverage: National

Temporal coverage: 1950s to 1990s

Characterization of supporting data set(s): Data are from the U.S. Geological Survey (USGS) stream gauge network using standard

USGS protocols. Data are available in the form of daily streamflow values reported as the average volume of water per second over a 24-hour period. Gauge placement by the USGS is not a random process as gauges are generally placed on larger, perennial streams and rivers, and changes seen in these larger systems may differ from those seen in smaller streams and rivers (The Heinz Center, 2002). The number of sites with at least one no-flow day in a year was determined for each water year from 1950 to 1999. The corresponding percentage value for that year was also calculated as 100 x (number of sites/total sites). The percentage values were then averaged over each decade (i.e., 1950s, 1960s, 1970s, 1980s, and 1990s). This procedure was followed for all sites with greater than 50% grassland/shrubland cover as well as for each ecoregion (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): USGS stream gauge network. Presented in *The State of the Nation's Ecosystems*, pages 166 and 259 (The Heinz Center, 2002).

Web site: http://water.usgs.gov/nwis/discharge

Indicator name: Sedimentation index

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: Statistically selected stream sites in the Mid-Atlantic states (parts of Virginia, Maryland, Pennsylvania, and New York and all of West Virginia)

Temporal coverage: 1993-1994 sampling years

Characterization of supporting data set(s): About 450 stream reaches were sampled in the Mid-Atlantic Highlands. To describe the condition of all streams within the Highlands without sampling all of them EMAP worked with EPA Region 3 and the states to develop a regional statistical survey of streams. A sedimentation index was developed for streams in the Mid-Atlantic Highlands to assess the quality of instream habitat to support aquatic communities. Stream sedimentation was defined as an increase or excess in the amount of fine substrate particles (smaller than 16mm diameter) relative to an expected reference value that is based on the region and the

Indicator derivation (project, program, organization, report): U.S. Environmental Protection Agency. *Mid-Atlantic Highlands Streams Assessment*, EPA 903-R-00-015. Philadelphia, PA: U.S. Environmental Protection Agency Region 3, Office of Research and Development, August 2000.

Web site: MAIA Report http://www.epa.gov/maia/html/maha.html

Indicator name: Atmospheric deposition of nitrogen

Indicator type (status or trend): Status and trend

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: NADP/NTN consists of over 250 sites in the continental U.S., Alaska, Puerto Rico, and the Virgin Islands.

Temporal coverage: 2001

Characterization of supporting data set(s): 1) The data is collected by uniform methods/protocol under the National Atmospheric Deposition Program (NADP)/National Trends Network (NTN) and the Clean Air Status and Trends Network (CASTNet). The NADP is a cooperative program among federal and state agencies, universities, electric utilities, and other industries that has measured precipitation chemistry in the U.S. since 1978. The NADP/NTN is a nationwide network of precipitation monitoring sites designed to measure regional levels of atmospheric deposition. The NADP/NTN measures wet acid deposition that occurs in rain, snow, or sleet) weekly at about 250 monitoring stations throughout the U.S. The data are subject to strict quality assurance and completeness screening in the field, in the laboratory, and during analysis. 2) CASTNet is a nationwide network of over 70 sites concentrated in the eastern continental U.S. that measure ambient air concentrations of pollutants. CASTNet has not yet completed its expansion into the Great Plains and western states. CASTNet also measures dry deposition (the process through which particles and gases are deposited in the absence of precipitation) of acidic compounds. CASTNet data are also subject to strict quality assurance and completeness criteria (EPA, OAR, November 2002).

Indicator derivation (project, program, organization, report): NADP/NTN and CASTNet

Web site: http://nadp.sws.uiuc.edu/isopleths/maps2001/no3dep.pdf and http://nadp.sws.uiuc.edu/isopleths/maps2001/nh4dep.pdf

Indicator name: Nitrate in farmland, forested, and urban streams and ground water

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: National. Major river basins and watersheds across U.S.

Temporal coverage: 1992-1998

Characterization of supporting data set(s): Nitrate data were collected annually from 105 stream sites and 1,190 wells in agricultural areas from 36 major river basins in the conterminous U.S. 1992-1998. The U.S. Geological Survey's (USGS) National Water Quality Assessment (NAWQA) program samples watersheds with relatively homogeneous land use/land cover to better illuminate the effect of land use on water quality. All sample were collected and analyzed by

USGS according to the overall NAWQA design. The data are highly aggregated and should be interpreted mainly as an indication of general national patterns (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): USGS, NAWQA. Presented in *The State of the Nation's Ecosystems*, pages 95 and 232 (The Heinz Center, 2002)

Web site: http://water.usgs.gov/nawqa

Indicator name: Total nitrogen in coastal waters

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: Mid-Atlantic estuaries

Temporal coverage: 1997-1998

Characterization of supporting data set(s): The EPA Mid-Atlantic Integrated Assessment (MAIA) Estuaries Summary Database contains water quality, sediment, benthic community, and fish data collected by several partners in MAIA Region estuaries in 1997 and 1998. The MAIA program conducted regular fish surveys during the summer of 1998 to characterize the structure and health of the fish communities. The stations sampled were selected according to a probabilistic design. These stations were not identical with the stat ons sampled for water and sediment quality analyses conducted primarily in 1997; therefore, it is not possible to directly compare these different analyses station by station. However, it is statistically valid to compare results among *classes* of estuaries, (e.g., large versus small estuaries, Delaware Estuary versus Chesapeake Estuary).

Indicator source (project, program, organization, report): U.S. Environmental Protection Agency. *Mid- Atlantic Integrated Assessment, MAIA - Estuaries 1997-98, Summary Report*, EPA 620-R-02-003. Narragansett, RI: U.S. Environmental Protection Agency, Office of Research and Development, Atlantic Ecology Division, May 2003.

Web site: MAIA Estuaries data http://www.epa.gov/emap/maia/html/data/estuary/9798/xport.html

Indicator name: Phosphorus in farmland, forested, and urban streams

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: National. Major river basins and watersheds across U.S.

Temporal coverage: 1992-1998

Characterization of supporting data set(s): Phosphorus data were collected annually from 105 stream sites in agricultural areas from 36 major river basins in the conterminous U.S. 1992-1998. The U.S. Geological Survey's (USGS) National Water Quality Assessment (NAWQA) program samples watersheds with relatively homogeneous land use/land cover to better illuminate the effect of land use on water quality. All sample were collected and analyzed by USGS according to the overall NAWQA design. The data are highly aggregated and should be interpreted mainly as an indication of general national patterns (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): USGS, NAWQA. Presented in *The State of the Nation's Ecosystems*, pages 96 and 232 (The Heinz Center, 2002)

Web site: http://water.usgs.gov/nawqa

Indicator name: Phosphorus in large rivers

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: National. Major river basins and watersheds across U.S.

Temporal coverage: 1992-1998

Characterization of supporting data set(s): Phosphorus data were collected annually from 140 stream sites in agricultural areas from 36 major river basins in the conterminous U.S. 1992-1998. The U.S. Geological Survey's (USGS) National Water Quality Assessment (NAWQA) and National Stream Water Quality Accounting Network (NASQAN) program sampling efforts from 1992 to 1998. NAWQA samples watersheds with relatively homogeneous land use/land cover to better illuminate the effect of land use on water quality. All sample were collected and analyzed by USGS according to the overall NAWQA design. The data are highly aggregated and should be interpreted mainly as an indication of general national patterns (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): USGS, NAWQA. Presented in , pages 141 and 248 (The Heinz Center, 2002)

Web site: http://water.usgs.gov/nawqa

Indicator name: Total phosphorus in coastal waters

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: Mid-Atlantic estuaries

Temporal coverage: 1997-1998

Characterization of supporting data set(s): The EPA Mid-Atlantic Integrated Assessment (MAIA) Estuaries Summary Database contains water quality, sediment, benthic community, and fish data collected by several partners in MAIA Region estuaries in 1997 and 1998. The MAIA program conducted regular fish surveys during the summer of 1998 to characterize the structure and health of the fish communities. The stations sampled were selected according to a probabilistic design. These stations were not identical with the stations sampled for water and sediment quality analyses conducted primarily in 1997; therefore, it is not possible to directly compare these different analyses station by station. However, it is statistically valid to compare results among classes of estuaries, (e.g., large versus small estuaries, Delaware Estuary versus Chesapeake Estuary).

Indicator source (project, program, organization, report): U.S. Environmental Protection Agency. *Mid-Atlantic Integrated Assessment, MAIA-Estuaries 1997-98, Summary Report,* EPA 620-R-02-003. Narragansett, RI: EPA, Office of Research and Development, Atlantic Ecology Division, May 2003.

Web site: MAIA Estuaries data
http://www.epa.gov/emap/maia/html/data/estuary/9798/xport.html

Indicator name: Atmospheric deposition of mercury

Indicator type (status or trend): Status and trend

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: National with limited coverage related to mercury emission sources

Temporal coverage: 2001

Characterization of supporting data set(s): The National Atmospheric Deposition Program (NADP), Mercury Deposition Network (MDN) is a cooperative program among federal and state agencies, universities, electric utilities, and other industries. Samples were collected from 50 sites across the U.S. related to mercury emissions. The network uses standardized methods for collection and analyses. Weekly precipitation samples are collected and analyzed by cold vapor atomic fluorescence. The MDN provides data for total mercury, but also includes methylmercury if desired by a site sponsor.

Indicator derivation (project, program, organization, report): NADP, MDN

Web site:
http://nadp.sws.uiuc.edu/mdn/maps/2001/01MDNdepo.pdf

Indicator name: Chemical contamination in streams and ground water

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: Lower 48 states

Temporal coverage: 1992-1998

Characterization of supporting data set(s): The data for freshwater streams and ground water were collected and analyzed by the U.S. Geological Survey's (USGS), National Water Quality Assessment (NAWQA) in 36 major river basins and aquifers across the U.S.

Indicator derivation (project, program, organization, report): USGS, NAWQA. Presented in *The State of the Nation's Ecosystems*, pages 48-51 and 210 (The Heinz Center, 2002).

Web site: http://water.usgs.gov/nawqa

Indicator name: Pesticides in farmland streams and ground water

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: National in scope, 20 hydrologic basins

Temporal coverage: 1992-1998

Characterization of supporting data set(s): Data collection from 1992-1996 included analyses for 76 pesticides and 7 selected pesticide degradation products, in 8,200 samples of ground water/surface water in 20 of the nation's major hydrologic basins. The U.S. Geological Survey's (USGS) National Water Quality Assessment (NAWQA) program samples watersheds with relatively homogeneous land use/land cover to better illuminate the effect of land use on water quality. All sample were collected and analyzed by USGS according to the overall NAWQA design. The data are highly aggregated and should be interpreted mainly as an indication of general national patterns (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): USGS, NAWQA. Presented in *The State of the Nation's Ecosystems*, pages 97-98 and 234 (The Heinz Center, 2002)

Web site: http://water.usgs.gov/nawqa

Indicator name: Acid sensitivity in lakes and streams

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: Eastern United States

Temporal coverage: 1984-1986

Characterization of supporting data set(s): In the mid-1980's, the U.S. Environmental Protection Agency (EPA) and other federal agencies commissioned a National Surface Water Survey (NSWS) to examine the effect of acid deposition in over 1,000 lakes 1,000 lakes larger than 10 acres and in thousands of miles of streams believed to be sensitive to acidification.

Indicator source (project, program, organization, report): 1) EPA, NSWS and 2) Baker, L.A., A. Herlihy, P. Kaufmann, and J. Eilers. Acid Lakes and Streams in the United States: the role of acid deposition. *Science* 252:1151-1154 (1991).

Web site: NSWS not available online and Baker, et al., not available on a noncommercial website.

Indicator name: Toxic releases to water of mercury, dioxin, lead, PCBs, and PBTs

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: National

Temporal coverage: 2000

Characterization of supporting data set(s): The U.S. Environmental Protection Agency (EPA) Toxics Release Inventory (TRI) database consists of release and other waste management information from facilities. EPA requires facilities to use one or more of four general approaches to estimating/measuring releases, namely, monitoring, emission factors, mass balance, and engineering calculations. Facilities report release and other waste management information along with information about release estimation methods.

Indicator source (project, program, organization, report): U.S. Environmental Protection Agency. *2000 Toxics Release Inventory Public Data Release Report*, EPA 260-S-02-001. Washington, DC: U.S. Environmental Protection Agency, Office of Environmental Information, May 2002.

Web site: http://www.epa.gov/tri/

Indicator name: Sediment contamination of inland waters

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: National, generally from sites targeted for contamination problems

Temporal coverage: 1980-1999

Characterization of supporting data set(s): Data are contained in the U.S. Environmental Protection Agency's (EPA) National Sediment Quality Inventory, comprehensive national survey of data about the quality of aquatic sediments in the United States mandated by Congress, and the forthcoming report of this data is an update of a 1997 report. The underlying data primarily are those reported to the EPA Storage and Retrieval (STORET) database. Data are from 19,470 sites evaluated. Limitations of the compiled data include: the mixture of data sets derived from different sampling strategies; incomplete sampling coverage; the age and quality of the data; and missing information, such as latitude and longitude. The limitations of the evaluation approach include uncertainties in the tools used to assess sediment quality. Because of these limitations, the draft report assesses locations in the U.S. where there is the probability of adverse effects to human health and the environment. Since the data in this report come from non-random sampling and do not cover the entire country, EPA states that it is not appropriate to come up with a national estimate of contaminated sediments. EPA also states that the results from the trend assessment should not be extrapolated to areas of the country where data were not available.

Indicator derivation (project, program, organization, report): U.S. Environmental Protection Agency. *The Incidence and Severity of Sediment Contamination in Surface Waters of the United States, National Sediment Quality Survey: Second Edition, DRAFT*, EPA 823-R-01-01. Washington, DC: EPA, Office of Water, December 2001.

Web site: http://www.epa.gov/waterscience/cs/surveyfs.html

Indicator name: Sediment contamination of coastal waters

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: Eastern U.S. south of Cape Cod and Gulf of Mexico estuaries

Temporal coverage: 1990-1997

Characterization of supporting data set(s): The data for sediments and fish contamination in coastal waters were collected and analyzed by the U.S. Environmental Protection Agency's (EPA) Environmental Monitoring and Assessment Program (EMAP). The data were collected in a manner that allows conclusions to be drawn concerning the majority (approximately 76 percent) of the area of estuaries in the United States. The list of contaminants targeted in sediments by EMAP include pesticides, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and heavy metals. Samples collected from over 2,000 location for measurement of over 100 contaminants. Sample sites selected based upon statistically random design.

Indicator source (project, program, organization, report): EPA's EMAP Estuaries data set (EPA, 2001) implemented through partner-

ships with the National Oceanic and Atmospheric Administration (NOAA), the U.S. Geological Survey (USGS), coastal states, and academia as reported in U.S. Environmental Protection Agency. *National Coastal Condition Report*, EPA 620-R-01-005. Washington DC: EPA, Office of Research and Development and Office of Water, September 2001. Presented in *The State of the Nation's Ecosystems*, 72 and 220 (The Heinz Center, 2002).

Web site: *EMAP* http://www.epa.gov/emap/; *NCCR* http://epa.gov/owow/oceans/nccr/downloads.html

Indicator name: Sediment toxicity in estuaries

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What are pressures to water quality?

Spatial coverage: Eastern U.S. south of Cape Cod and Gulf of Mexico estuaries

Temporal coverage: 1990-1997 for EMAP and since 1986 for NOAA

Characterization of supporting data set(s): The data were collected and analyzed by the U.S. Environmental Protection Agency's (EPA) Environmental Monitoring and Assessment Program (EMAP) and the National Oceanic and Atmospheric Administration (NOAA) National Status and Trends (NS&T) Program. 1) The EMAP data from over 2,500 location were collected in a manner that allows conclusions to be drawn concerning the majority (approximately 76 percent) of the area of estuaries in the United States. Sample sites selected based upon statistically random design. 2) The NOAA NS&T bioeffects program collected toxicity data from 22 major estuaries of the United States.

Indicator derivation (project, program, organization, report): EPA's EMAP Estuaries data set (EPA, 2001) implemented in partnership with NOAA, as reported in U.S. Environmental Protection Agency. *National Coastal Condition Report*, EPA 620-R-01-005. Washington DC: U.S. Environmental Protection Agency, Office of Research and Development and Office of Water, September 2001.

Web site: *EMAP* http://www.epa.gov/emap/; *NCCR* http://epa.gov/owow/oceans/nccr/downloads.html; *NOAA* http://ccmaserver.nos.noaa.gov/NSandT/New_NSandT.html

Drinking Water

Indicator name: Population served by community water systems that meet all health-based standards

Indicator type (status or trend): Status and trends

Indicator category (1 or 2): 1

Associated question: What is the quality of drinking water?

Spatial coverage: National

Temporal coverage: 1993-2001

Characterization of supporting data set(s): Community water systems report monitoring violations quarterly to the states and data are compiled by the U.S. Environmental Protection Agency (EPA). The over 55,000 water systems that are required to report violations serve about 94% of the U.S. population. The Safe Drinking Water Information System (SDWIS) contains information about public water systems and their violations of EPA's drinking water regulations, as reported to EPA by states and EPA regions in conformance with reporting requirements established by statute, regulation and guidance. States report the following information to EPA:

- Basic information on each water system, including: name, ID number, number of people served, type of system (year-round or seasonal), and source of water (ground water or surface water);
- Violation information for each water system: whether it has followed established monitoring and reporting schedules, complied with mandated treatment techniques, or violated any Maximum Contaminant Levels (MCLs);
- Enforcement information: what actions states have taken to ensure that drinking water systems return to compliance if they are in violation of a drinking water regulation;
- Sampling results for unregulated contaminants and for regulated contaminants when the monitoring results exceed the MCL.

Indicator derivation (project, program, organization, report): EPA SDWIS Federal version.

Web site: http://www.epa.gov/safewater/sdwisfed/sdwis.htm

Recreation in and on the Water

Indicator name: Number of beach days that beaches are closed or under advisory

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What is the condition of surface waters supporting recreational use?

Scale and coverage: National, coastal

Temporal coverage: 2001 reporting year, collected since 1997

Characterization of supporting data set(s): A questionnaire is sent to managers (usually health or environmental quality departments in states, counties, or cities) responsible for monitoring swimming beaches on the coasts or estuaries of the Atlantic Ocean, Pacific Ocean, and Gulf of Mexico, and the shoreline of the Great Lakes; information on some inland fresh water beaches has also been collected. Days that beaches are closed or under advisory are extracted from the survey and compiled by the U.S. Environmental Protection Agency (EPA). Respondents numbered 237 in 2001 reporting on 2,445 beaches.

Indicator derivation (project, program, organization, report): U.S. Environmental Protection Agency. *EPA's Beach Watch Program: 2001 Swimming Season*, EPA 823-F-02-006. Washington, DC: U.S. Environmental Protection Agency, Office of Water, May 2002.

Web site: http://www.epa.gov/waterscience/beaches/2001 surveyfs.pdf

Consumption of Fish and Shellfish

Indicator name: Percent of river miles and lake acres under fish consumption advisories

Indicator type (status or trend): Status and trend

Indicator category (1 or 2): 2

Associated question: What is the condition of waters that support consumption of fish and shellfish?

Spatial coverage: National

Temporal coverage: 1993-2001

Characterization of supporting data set(s): The National Listing of Fish and Wildlife Advisories (NLFWA) database includes all available information describing state-, tribal-, and federally-issued fish consumption advisories in the United States for the 50 States, the District of Columbia, and four U.S. Territories, and in Canada for the 12 provinces and territories. The database contains information provided to the U.S. Environmental Protection Agency (EPA) by the states, tribes, territories and Canada. The EPA has compiled these advisory data into a database which lists, among other things, species and size of fish or wildlife under advisory, chemical contaminants covered by the advisory, location and surface area of the waterbody under advisory, and population subject to the advisory.

Indicator derivation (project, program, organization, report): U.S. Environmental Protection Agency. *Update: National Listing of Fish and Wildlife Advisories*. EPA 823-F-02-007. Washington, DC: EPA, Office of Water, May 2002.

Web site: http://www.epa.gov/waterscience/fish/advisories/ factsheet.pdf

Indicator name: Contaminants in fresh water fish

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What is the condition of waters that support consumption of fish and shellfish?

Spatial coverage: Lower 48 states

Temporal coverage: 1992-1998 (USGS)

Characterization of supporting data set(s): From 1992 to 1998, fish samples were collected and analyzed from 223 stream sites by the U.S. Geological Survey's (USGS) National Water Quality Assessment (NAWQA) program. Tissue composites from whole fish were analyzed for polychlorinated biphenyls (PCBs), organochlorine pesticides, and trace elements. The stream sites selected were r epresentative of a large range of stream sizes, land use practices and were not selected to be a statistical representation of U.S. streams (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): USGS, NAWQA; EPA, EMAP and GLNPO. Presented in *The State of the Nation's Ecosystems*, pages 48-51 and 210 (The Heinz Center, 2002).

Web site: NAWQA http://water.usgs.gov/nawqa

Indicator name: Number of watersheds exceeding health-based national water quality criteria for mercury and PCBs in fish tissue

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What is the condition of waters that support consumption of fish and shellfish?

Spatial coverage: National; for mercury, 35 states (West coast and eastern two-thirds of the U.S.)

Temporal coverage: 2001 reporting year, collected 1993-2001

Characterization of supporting data set(s): The data set is a compilation of fish tissue quality data housed in the U.S. Environmental Protection Agency's (EPA) National Listing of Fish and Wildlife Advisories (NLFWA) fish tissue database. Mercury data represented in 696 watersheds and PCBs in 153 watersheds. Mercury map is based on 22,000 records of fish tissue mercury concentrations from the NLFWA where air deposition is the sole significant source of mercury. Watersheds are eliminated from the analysis if they contain potentially significant, but unquantified, runoff and effluent loads from mercury mines, large-producer gold mines, and mercury-cell chlor-alkali facilities. Watersheds are also eliminated when the total screening level effluent load estimates for municipal wastewater treatment plants and pulp and paper mills are above five percent of the estimated waterbody-delivered air deposition load (EPA, Office of Water, November 2001).

Indicator derivation (project, program, organization, report): EPA NLFWA Mercury Fish Tissue Database, June 2001 as presented in U.S. Environmental Protection Agency. *Mercury Maps: Linking Air Deposition and Fish Contamination on a National Scale*. EPA 823-F-01-026. Washington, DC: EPA, Office of Water, November 2001.

Web site: Mercury map
http://www.epa.gov/waterscience/maps/factsheet.pdf

Chapter 3: Better Protected Land

Land Use

Indicator name: Extent of developed lands

Indicator type (status or trend): Status and Trend

Indicator Category: 1

Associated question: What is the extent of developed lands?

Spatial coverage: National, statistical sample of non-federal lands. The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service's (NRCS) National Resources Inventory (NRI) collects data at the same 800,000 sampling sites every five years in all 50 states, Puerto Rico, the U.S. Virgin Islands, and some Pacific Basin locations.

Temporal coverage: At each NRI sample point, information is available for 1982, 1987, 1992, and 1997 so that trends and changes in land use and resource characteristics over 15 years can be examined and analyzed.

Characterization of supporting data set(s): NRI is a statistical sampling of over 800,000 locations to collect data on land cover and use, soil erosion, prime farmland soils, wetlands, habitat diversity, conservation practices, and related resource attributes. NRI is a compilation of natural resource information on non-Federal land in the U.S.

Indicator derivation (project, program, organization, report): U.S. Department of Agriculture. *Summary Report: 1997 National Resources Inventory (Revised December 2000)*, Washington, DC: Natural Resources Conservation Service and Ames, Iowa: Iowa State University, Statistical Laboratory, 2000.

Web site: http://www.nrcs.usda.gov/technical/NRI/

Indicator name: Extent of urban and suburban lands

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: What is the extent of developed lands?

Spatial coverage: Lower 48 states.

Temporal coverage: 1992 satellite land cover data.

Characterization of supporting data set(s): The National Land Cover Dataset (NLCD). In the 1990s, a federal interagency

consortium (the Multi-Resolution Land Characterization (MRLC) consortium) was created to coordinate access to and use of land cover data from the Landsat 5 Thematic Mapper. Using Landsat data and a variety of ancillary data, the consortium processed data from a series of 1992 Landsat images, to create the NLCD on a square grid covering the lower 48 states. The MRLC NLCD with 21 land cover classes, was further processed by the USGS for the Heinz Center to estimate the urban and suburban area coverage for the U.S.

Indicator derivation (project, program, organization, report): U.S. Environmental Protection Agency, Office of Research and Development. Multi-resolution land characteristics consortium - national land cover data. 1992. (February 19, 2003; *http://www.epa.gov/mrlc/nlcd.html*). Presented in *The State of the Nation's Ecosystems*, pages 181 and 264 (The Heinz Center, 2002).

Web site: Data are available from http://www.usgs.gov/mrlcreg.html

Indicator name: Extent of agricultural land uses

Indicator type (status or trend): Status and Trend

Indicator Category: 1

Associated question: What is the extent of farmlands?

Spatial coverage: National, statistical sample of non-federal lands. The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service's (NRCS) National Resources Inventory (NRI) collects data at the same 800,000 sampling sites every five years in all 50 states, Puerto Rico, the U.S. Virgin Islands, and some Pacific Basin locations.

Temporal coverage: At each NRI sample point, information is available for 1982, 1987, 1992, and 1997 so that trends and changes in land use and resource characteristics over 15 years can be examined and analyzed.

Characterization of supporting data set(s): NRI is a statistical sampling of over 800,000 locations to collect data on land cover and use, soil erosion, prime farmland soils, wetlands, habitat diversity, conservation practices, and related resource attributes. NRI is a compilation of natural resource information on non-Federal land in the U.S.

Indicator derivation (project, program, organization, report): U.S. Department of Agriculture. *Summary Report: 1997 National Resources Inventory (Revised December 2000)*, Washington, DC: Natural Resources Conservation Service and Ames, Iowa: Iowa State University, Statistical Laboratory, 2000.

Web site: http://www.nrcs.usda.gov/technical/NRI/

Indicator name: The farmland landscape

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: What is the extent of farmlands?

Spatial coverage: Lower 48 states.

Temporal coverage: 1992 satellite land cover data.

Characterization of supporting data set(s): The National Land Cover Dataset (NLCD). In the 1990s, a federal interagency consortium (the Multi-Resolution Land Characterization (MRLC) consortium) was created to coordinate access to and use of land cover data from the Landsat 5 Thematic Mapper. Using Landsat data and a variety of ancillary data, the consortium processed data from a series of 1992 Landsat images, to create the NLCD on a square grid covering the lower 48 states. The MRLC NLCD with 21 land cover classes, was aggregated and reprocessed by the USGS for the Heinz Center to estimate the farmland landscape coverage for the U.S.

Indicator derivation (project, program, organization, report): U.S. Environmental Protection Agency, Office of Research and Development. Multi-resolution land characteristics consortium - national land cover data. 1992. (February 19, 2003; *http://www.epa.gov/mrlc/nlcd.html*). Presented in *The State of the Nation's Ecosystems*, pages 92 and 231 (The Heinz Center, 2002).

Web site: Data are available from http://www.usgs.gov/mrlcreg.html

Indicator name: Extent of grasslands and shrublands

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: What is the extent of grasslands and shrublands?

Spatial coverage: The lower 48 states and Alaska.

Temporal coverage: 1992 satellite imagery

Characterization of supporting data set(s): The Multi-Resolution Land Characterization (MRLC) Consortium's National Land Cover Dataset (NLCD) with 21 land cover classes, was used to estimate the area coverage for the U.S. The NLCD is based on remotely sensed imagery from the Landsat 5 Thematic Mapper. Data for Alaska were estimated from a vegetation map of Alaska by Fleming (1996) based on Advanced Very High Resolution Radiometer (AVHRR) remote-sensing images with an approximate resolution of 1 km on a side (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): 1) U.S. Environmental Protection Agency, Office of Research and Development. Multi-resolution land characteristics consortium - national land cover data. 1992. (February 19, 2003; *http://www.epa.gov/mrlc/nlcd.html*). 2) Flemming, M.D. A *Statewide Vegetation Map of Alaska Using a Phenological Classification of AVHRR Data*. Anchorage, AK: 1996 Alaska Surveying and Mapping Conference, February 1996. Presented in *The State of the Nation's Ecosystems*, pages 161 and 256 (The Heinz Center, 2002).

Web site: Data are available from http://www.usgs.gov/mrlcreg.html

Indicator name: Extent of forest area, ownership, and management

Indicator type (status or trend): Status and Trend

Indicator Category: 1

Associated question: What is the extent of forest lands?

Spatial coverage: National

Temporal coverage: Data from late 1940s to present. Data since 1953 provided with a reliability of ± 3- 10 percent per 1 million acres (67 percent confidence limit). FIA provides updates of assessment data every five years.

Characterization of supporting data set(s): The USDA Forest Service Forest Inventory and Analysis (FIA) program is a survey-based program that has operated since the late 1940s, collecting information on a variety of forest characteristics. FIA has used a two-phase sample (generally, double sampling for stratification) to collect information on the nation's forests. Phase one establishes a large number of samples (more than 4 million, roughly every 0.6 miles). These are selected using aerial photographs or other remote-sensing images, which are then interpreted for various forest attributes. Phase two establishes a subset of approximately 450,000 phase-one points (roughly every 3 miles) for ground sampling. About 125,000 of these samples are permanently established on forest land. The forest characteristics measured include ownership, protection status, species composition, stand age and structure, tree growth, occurrences of mortality and removals, tree biomass, incidences of pathogens, natural and human-caused disturbances, and soil descriptors (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): U.S. Department of Agriculture, U.S. Forest Service. Draft Resource Planning Act assessment tables. August 12, 2002. (September 2003; *http://www.ncrs.fs.fed.us/4801/FIADB/rpa_tabler/Draft_RPA_ 2002_Forest_Resource_Tables.pdf*). Presented in *The State of the Nation's Ecosystems*, pages 117 and 239 (The Heinz Center, 2002).

Web site: http://www.fia.fs.fed.us/

Indicator name: Sediment runoff potential from croplands and pasturelands

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: What are the ecological effects associated with land uses?

Spatial coverage: National, statistical sample of non-federal lands. The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service's (NRCS) National Resources Inventory (NRI) collects data at the same 800,000 sampling sites every five years in all 50 states, Puerto Rico, the U.S. Virgin Islands, and some Pacific Basin locations.

Temporal coverage: At each NRI sample point, information is available for 1982, 1987, 1992, and 1997 so that trends and changes in land use and resource characteristics over 15 years can be examined and analyzed. NRI is a compilation of natural resource information on non-Federal land in the U.S.

Characterization of supporting data set(s): Data are from USDA/NRCS STATSGO Soils Data and NRI 1997 data (adjusted in 2000). The Soil and Water Assessment Tool (SWAT) is a public domain model actively supported by the USDA Agricultural Research Service (ARS) at the Grassland, Soil and Water Research Laboratory in Temple, Texas.

Indicator derivation (project, program, organization, report): Walker, Clive. Sediment Runoff Potential, 1990-1995. Hydrologic Unit Modeling of the United States (HUMUS) Project. Temple, TX: Texas Agricultural Experiment Station. August 24, 1999.

Web site: *Exhibit source* http://www.epa.gov/iwi/1999sept/iv12c_usmap.html; *NRI* http://www.nrcs.usda.gov/technical/NRI/; *SWAT* http://www.brc.tamus.edu/swat/

Chemicals in the Landscape

Indicator name: Quantity and type of toxic chemicals released and managed

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: How much and what types of toxics are released into the environment?

Spatial coverage: National

Temporal coverage: 1998-2000

Characterization of supporting data set(s): The U.S. Environmental Protection Agency's (EPA) Toxics Release Inventory (TRI) database consists of release and other waste management information from facilities. EPA requires facilities to use one or more of four general approaches to estimating/measuring releases, namely, monitoring, emission factors, mass balance, and engineering calculations. Facilities report release and other waste management information along with information about release estimation methods.

Indicator derivation (project, program, organization, report): U.S. Environmental Protection Agency. *2000 Toxics Release Inventory Public Data Release Report*, EPA 260-S-02-001. Washington, DC: U.S. Environmental Protection Agency, Office of Environmental Information, May 2002.

Web site: http://www.epa.gov/tri/

Indicator name: Agricultural pesticide use

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: What is the volume, distribution, and extent of pesticide use?

Spatial coverage: National

Temporal coverage: 1992 and 1997

Characterization of supporting data set(s): Data are based on the National Center for Food and Agricultural Policy (NCFAP) Pesticide Use Database, a database of information on pesticide applications to cropland for 220 active ingredients.

Indicator derivation (project, program, organization, report): Data from the NCFAP, a private, non-profit, non-advocacy research organization, as reported in Gianessi, L.P., and M.B. Marcelli. *Pesticide Use in U.S. Crop Production*. Washington D.C. November, 2000.

Web site: http://www.ncfap.org/ncfap/nationalsummary1997.pdf

Indicator name: Fertilizer use

Indicator type (status or trend): Status and Trend

Indicator Category: 2

Associated question: What is the volume, distribution, and extent of fertilizer use?

Spatial coverage: National

Temporal coverage: 1960-1998

Characterization of supporting data set(s): Data in the U.S. Department of Agriculture's (USDA) Agricultural Resources and Environmental Indicators Report is based on a variety of surveys, as well as the Census of Agriculture and the Natural Resources Inventory.

Indicator derivation (project, program, organization, report): Daberkow, S., H. Taylor, and W. Huang. "Agricultural Resources and Environmental Indicators: Nutrient Use and Management." September, 2000. In *Agricultural Resources and Environmental Indicators*, Agricultural Handbook No. AH722. U.S. Department of Agriculture, Economic Research Service, Washington, DC, February 2003, 4.4.1-4.4.49.

Web site: http://www.ers.usda.gov/publications/arei/arei2001/

Indicator name: Pesticide residues in food

Indicator type (status or trend): Trend

Indicator Category: 1

Associated question: What is the potential disposition of chemicals used on land?

Scale and coverage: National

Temporal coverage: 1997-2000

Characterization of supporting data set(s): The U.S. Department of Agriculture's (USDA) Pesticide Data Program (PDP) was started by USDA in May 1991 to provide data on pesticide dietary exposure, food consumption, and pesticide usage. PDP data are based on samples of approximately 50 different commodities tested for more than 290 different pesticides.

Indicator derivation (project, program, organization, report): Data from U.S. Department of Agriculture, Agricultural Marketing Service. *Pesticide Data Program: Annual Summary Calendar Year 2000*, Washington, DC: U.S. Department of Agriculture, February 2002. PDP is USDA's program to collect data on pesticide residues in food.

Web site: http://www.ams.usda.gov/science/pdp/

Indicator name: Potential pesticide runoff from farm fields

Indicator type (status or trend): Status

Indicator Category: 1

Associated question: What is the potential disposition of chemicals used on land?

Spatial coverage: National, statistical sample of non-federal lands. The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service's (NRCS) National Resources Inventory (NRI) collects data at the same 800,000 sampling sites every five years in all 50 states, Puerto Rico, the U.S. Virgin Islands, and some Pacific Basin locations.

Temporal coverage: At each NRI sample point, information is available for 1982, 1987, 1992, and 1997 so that trends and changes in land use and resource characteristics over 15 years can be examined and analyzed. The data used in this analysis were from 1992.

Characterization of supporting data set(s): Using national-level databases, a simulation was conducted of potential pesticide losses from representative farm fields. About 170,000 Natural Resources Inventory (NRI) sample points were treated as "representative fields." Thirteen crops were included in the simulation: barley, corn, cotton, oats, peanuts, potatoes, rice, sorghum, soybeans, sugar beets, sunflowers, tobacco, and wheat. The potential for pesticide loss from each "representative field" was estimated using the state average pesticide application rate and percent acres treated from the National Pesticide Use Database. The maximum percent runoff loss over a 20-year simulation of rainfall from the Pesticide Loss Database was imputed to NRI sample points using match-ups by soil properties and proximity to 55 climate stations. The total loss of pesticides from each "representative field" was estimated by summing over the loss estimates for all the pesticides that the National

Pesticide Use Database reported for each State and crop. Watershed scores were determined by averaging the scores for the NRI sample points within each watershed.

Indicator derivation (project, program, organization, report): Data are from 1)1) National Resources Inventory, U.S. Department. of Agriculture, Natural Resources Conservation Service, 1992; 2) National Pesticide Use Database from Gianessi, Leonard P., and James Earl Anderson. *Pesticide Use in U.S. Crop Production: National Data Report.* National Center for Food and Agricultural Policy, Washington D.C., February 1995; and 3) Pesticide Loss Database from Don W. Goss, Texas Agricultural Experiment Station, Temple, Texas.

Web site: http://www.epa.gov/iwi/1999sept/iv12a_usmap.html

Indicator name: Risk of nitrogen export

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: What is the potential disposition of chemicals used on land?

Spatial coverage: Lower 48 states

Temporal coverage: 1992 satellite imagery

Characterization of supporting data set(s): The Multi-Resolution Land Characterization (MRLC) Consortium's National Land Cover Dataset (NLCD) with 21 land cover classes, was used to estimate the area coverage for the U.S. The NLCD is based on remotely sensed imagery from the Landsat 5 Thematic Mapper.

Indicator derivation (project, program, organization, report): 1) U.S. Environmental Protection Agency, Office of Research and Development. Multi-resolution land characteristics consortium - national land cover data. 1992. (February 19, 2003; *http://www.epa.gov/mrlc/nlcd.html*). 2) Wickham, J.D., K.H. Riitters, R.V. O'Neill, K.H. Reckhow, T.G. Wade, and K.B. Jones. Land cover as a framework for assessing risk of water pollution. *Journal of the American Water Resources Association* 36 (6): 1-6 (2000).

Web site: Data are available from http://www.usgs.gov/mrlcreg.html

Indicator name: Risk of phosphorus export

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: What is the potential disposition of chemicals used on land?

Spatial coverage: Lower 48 states

Temporal coverage: 1992 satellite imagery

Characterization of supporting data set(s): The Multi-Resolution Land Characterization (MRLC) Consortium's National Land Cover

Dataset (NLCD) with 21 land cover classes, was used to estimate the area coverage for the US. The NLCD is based on remotely sensed imagery from the Landsat 5 Thematic Mapper.

Indicator derivation (project, program, organization, report): 1) U.S. Environmental Protection Agency, Office of Research and Development. Multi-resolution land characteristics consortium - national land cover data. 1992. (February 19, 2003; *http://www.epa.gov/mrlc/nlcd.html*). 2) Wickham, J.D., K.H. Riitters, R.V. O'Neill, K.H. Reckhow, T.G. Wade, and K.B. Jones. Land cover as a framework for assessing risk of water pollution. *Journal of the American Water Resources Association* 36 (6): 1-6 (2000).

Web site: Data are available from http://www.usgs.gov/mrlcreg.html

Waste and Contaminated Lands

Indicator name: Quantity of municipal solid waste (MSW) generated and managed

Indicator type (status or trend): Status and Trend

Indicator Category: 2

Associated question: How much and what types of waste are generated and managed?

Spatial coverage: National

Temporal coverage: Trends in MSW management from 1960 to 1999, including source reduction, recovery for recycling (including composting), and disposal via combustion and landfilling.

Characterization of supporting data set(s): The supporting data set addresses MSW in the U.S. that is generated, recycled, and disposed. More recently, estimates of waste prevention have been included as well. Data are provided both for specific materials (glass, plastic, paper, etc.) in MSW and specific products (newspaper, aluminum cans, etc.) in MSW.

Indicator derivation (project, program, organization, report): Data are from U.S. Environmental Protection Agency. *Municipal Solid Waste in the United States: 2000 Facts and Figures,* EPA 530-S-02-001. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, June 2002.

Web site: http://www.epa.gov/epaoswer/non-hw/muncpl/msw99.htm

Indicator name: Quantity of RCRA hazardous waste generated and managed

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: How much and what types of waste are generated and managed?

Spatial coverage: National

Temporal coverage: Biennial

Characterization of supporting data set(s): Generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information about their activities to state environmental agencies. These agencies in turn pass on the information to regional and national EPA offices. This information is stored in EPA's RCRAInfo database.

Indicator derivation (project, program, organization, report): U.S. Environmental Protection Agency. *The National Biennial RCRA Hazardous Waste Report*, EPA 530-R-01-009. Washington DC: U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, June 2001.

Web site: http://www.epa.gov/epaoswer/hazwaste/data/brs99/index.htm

Indicator name: Quantity of radioactive waste generated and in inventory

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: How much and what types of waste are generated and managed?

Spatial coverage: National

Temporal coverage: Fiscal year 2000

Characterization of supporting data set(s): Summary data on the amounts (volume/mass) and location of the radioactive waste, spent nuclear fuel, and contaminated media managed by the U.S. Department of Energy (DOE). These data are provided in a publicly-available report (Summary Data Report) and are based on data in the DOE's Environmental Management (EM) Corporate Database (Central Internet Database).

Indicator derivation (project, program, organization, report): U.S. Department of Energy, Office of Environmental Management. Central Internet Database. 2002. (January 2003; *http://cid.em.doe.gov*).

Web site: http://cid.em.doe.gov

Indicator name: Number and location of municipal solid waste (MSW) landfills

Indicator type (status or trend): Status and Trend

Indicator Category: 2

Associated question: What is the extent of land used for waste management?

Spatial coverage: National

Temporal coverage: Trends in MSW management from 1960 to 1999, including source reduction, recovery for recycling (including composting), and disposal via combustion and landfilling.

Characterization of supporting data set(s): BioCycle magazine collects the MSW landfill data annually through a survey to state solid waste officers who relay the total number of landfills in each state (as reported by state agencies, counties, and/or municipalities). There is no quality review process for these data and there are differences in the ways data is collected and reported by the state programs.

Indicator derivation (project, program, organization, report): BioCycle Journal of Composting and Organics Recycling 41 (4), April 2000 as reprinted in U.S. Environmental Protection Agency. *Municipal Solid Waste in the United States: 2000 Facts and Figures*, EPA 530-S-02-001. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, June 2002.

Web site: http://www.epa.gov/epaoswer/non-hw/muncpl/msw99.htm

Indicator name: Number of RCRA hazardous waste management facilities

Indicator type (status or trend): Trend

Indicator Category: 2

Associated question: What is the extent of land used for waste management?

Spatial coverage: National

Temporal coverage: 1999

Characterization of supporting data set(s): RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). The RCRAInfo system allows tracking of many types of information about the regulated universe of RCRA hazardous waste handlers. RCRAInfo characterizes facility status, regulated activities, and compliance histories and captures detailed data on the generation of hazardous waste from large quantity generators and on waste management practices from treatment, storage, and disposal facilities.

Indicator derivation (project, program, organization, report): U.S. Environmental Protection Agency. *The National Biennial RCRA Hazardous Waste Report*, EPA 530-R-01-009. Washington DC: U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, June 2001.

Web site: http://www.epa.gov/epaoswer/hazwaste/data/index.htm

Indicator name: Number and location of Superfund National Priorities List sites

Indicator type (status or trend): Status and Trend

Indicator Category: 2

Associated question: What is the extent of contaminated land?

Spatial coverage: National

Temporal coverage: 1990-2002

Characterization of supporting data set(s): CERCLIS is the Comprehensive Environmental Response, Compensation, and Liability Information System. CERCLIS contains information on hazardous waste sites, potential hazardous waste sites, and remedial activities across the nation, including sites that are on the National Priorities List (NPL) or being considered for the NPL. CERCLIS is used by EPA to track activities conducted under its Superfund program. Specific information is tracked for each individual Superfund site. Sites which come to EPA's attention because of a potential for releasing hazardous substances into the environment are added to the CERCLIS inventory.

Indicator derivation (project, program, organization, report): EPA, Office of Solid Waste and Emergency Response. National Priorities List Site Totals by Status and Milestone. March 26, 2003. (April 3, 2003; *http://www.epa.gov/superfund/sites/query/ queryhtm/npltotal.htm*) and Number of NPL Site Actions and Milestones by Fiscal Year. March 26, 2003. (April 3, 2003; *http://www.epa.gov/ superfund/sites/query/queryhtm/nplfy/htm*).

Web site: http://www.epa.gov/superfund/sites/cursites/index.htm

Indicator name: Number and location of RCRA Corrective Action Sites

Indicator type (status or trend): Status and Trend

Indicator Category: 2

Associated question: What is the extent of contaminated land?

Spatial coverage: National

Temporal coverage: 1997-1999

Characterization of supporting data set(s): Corrective Action (CA) is the term the Resource Conservation and Recovery Act (RCRA) program uses to describe the cleanup of sites that manage hazardous wastes. The EPA Office of Solid Waste and Emergency Response (OSWER) CA program keeps information on CA sites in the RCRAInfo database. RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). The RCRAInfo system allows track-ing of many types of information about the regulated universe of RCRA hazardous waste handlers. RCRAInfo characterizes facility status, regulated activities, and compliance histories and captures detailed data on the generation of hazardous waste from large quantity generators and on waste management practices from treatment, storage, and disposal facilities. Currently, EPA believes that there are over 6,500 facilities subject to RCRA CA statutory authorities. Of these, approximately 3,700 facilities have CA already underway or will need to implement CA as part of the process to obtain a permit to treat, store, or dispose of hazardous waste. EPA refers to these 3,700 facilities as the "corrective action workload." To help prioritize resources further, EPA established specific short-term goals for 1,714 facilities referred to as the RCRA Cleanup Baseline.

Indicator derivation (project, program, organization, report): U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. Corrective action background. October 8, 2002. (October 15, 2002; *http://www.epa.gov/epaoswer/hazwaste/ ca/backgnd.htm#5*).

Web site: http://www.epa.gov/epaoswer/hazwaste/ca/index.htm

Chapter 4: Human Health

Health Status of the United States: Indicators and Trends of Health and Disease

Indicator name: Life expectancy

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends for life expectancy?

Spatial coverage: National. Data are for the 50 states and the District of Columbia, unless otherwise specified.

Temporal coverage: 1933 to present.

Characterization of supporting data set(s): National Center for Health Statistics (NCHS), through the National Vital Statistics Systems (NVSS), has collected and published data on births, deaths, marriages, and divorces in the United States. Virtually all births and deaths are registered. U.S. Standard Live Birth and Death Certificates are revised periodically. Most state certificates conform closely in content and arrangement to the standard certificate recommended by NCHS and all certificates contain a minimum data set specified by NCHS. The mother provides demographic information on the birth certificate, such as race and ethnicity, at the time of birth. Medical and health information is based on hospital records. Demographic information on the death certificate is provided by the funeral director based on information supplied by an informant. A physician, medical examiner, or coroner provides medical certification of cause of death.

Indicator source (project, program, organization, report): NCHS, NVSS

Web site: http://www.cdc.gov/nchs/nvss.htm

Indicator name: Cancer mortality

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends for cancer, cardiovascular disease, chronic obstructive pulmonary disease and asthma?

Spatial coverage: National. Data are for the 50 states and the District of Columbia, unless otherwise specified.

Temporal coverage: 1933 to present; 1973-1998 data displayed.

Characterization of supporting data set(s): National Center for Health Statistics (NCHS), through the National Vital Statistics

Systems (NVSS), has collected and published data on births, deaths, marriages, and divorces in the United States. Virtually all births and deaths are registered. U.S. Standard Live Birth and Death Certificates are revised periodically. Most state certificates conform closely in content and arrangement to the standard certificate recommended by NCHS and all certificates contain a minimum data set specified by NCHS. The mother provides demographic information on the birth certificate, such as race and ethnicity, at the time of birth. Medical and health information is based on hospital records. Demographic information on the death certificate is provided by the funeral director based on information supplied by an informant. A physician, medical examiner, or coroner provides medical certification of cause of death.

Indicator source (project, program, organization, report): NCHS, National Vital Statistics Systems (NVSS)

Web site: http://www.cdc.gov/nchs/nvss.htm

Indicator name: Cancer incidence

Indicator type (status or trend): Trend

Indicator category (1 or 2): 2

Associated question: What are the trends for cancer, cardiovascular disease, chronic obstructive pulmonary disease and asthma?

Spatial coverage: National

Temporal coverage: 1997-2001

Characterization of supporting data set(s): The purpose of the National Notifiable Disease Surveillance System is primarily to provide weekly provisional information on the occurrence of diseases defined as notifiable by the Council of State and Territorial Epidemiologists (CSTE) and annual summary data. State epidemiologists report cases of notifiable diseases to CDC, and CDC tabulates and publishes these data in the *Morbidity and Mortality Weekly Report (MMWR)* and the *Summary of Notifiable Diseases, United States*. Policies for reporting notifiable disease cases can vary by disease or reporting jurisdiction. CSTE and CDC annually review and recommend additions or deletions to the list or nationally notifiable diseases based on the need to respond to emerging priorities. However, reporting nationally notifiable diseases to CDC is voluntary. Reporting is currently mandated by law or regulation only at the local and state level. Therefore, the list of diseases that are considered notifiable varies slightly by state. Notifiable disease data are useful for analyzing disease trends and determining relative disease burdens. However, these data must be interpreted in light of reporting practices. The degree of completeness of data reporting also is influenced by the diagnostic facilities available, the control measures in effect, public awareness of a specific disease, and the interests, resources, and priorities of state and local officials responsible for disease control and public health surveillance, introduction of new diagnostic tests, or discovery of new disease entities can

cause changes in disease reporting that are independent of the true incidence of disease.

Indicator source (project, program, organization, report): Centers for Disease Control and Prevention, Epidemiology Program Office, National Notifiable Disease Surveillance System

Web site: *Morbidity and Mortality Weekly Report* http://www.cdc.gov/mmwr/; *Summary of Notifiable Diseases* http://www.cdc.gov/epo/dphsi/annsum/

Indicator name: Cardiovascular disease mortality

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends for cancer, cardiovascular disease, chronic obstructive pulmonary disease and asthma?

Spatial coverage: National. Data are for the 50 states and the District of Columbia, unless otherwise specified.

Temporal coverage: 1933 to present; 1900-1996 data displayed.

Characterization of supporting data set(s): National Center for Health Statistics (NCHS), through the National Vital Statistics Systems (NVSS), has collected and published data on births, deaths, marriages, and divorces in the United States. Virtually all births and deaths are registered. U.S. Standard Live Birth and Death Certificates are revised periodically. Most state certificates conform closely in content and arrangement to the standard certificate recommended by NCHS and all certificates contain a minimum data set specified by NCHS. The mother provides demographic information on the birth certificate, such as race and ethnicity, at the time of birth. Medical and health information is based on hospital records. Demographic information on the death certificate is provided by the funeral director based on information supplied by an informant. A physician, medical examiner, or coroner provides medical certification of cause of death.

Indicator source (project, program, organization, report): NCHS, NVSS

Web site: http://www.cdc.gov/nchs/nvss.htm

Indicator name: Cardiovascular disease prevalence

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends for cancer, cardiovascular disease, chronic obstructive pulmonary disease and asthma?

Spatial coverage: National

Temporal coverage: NHANES III, 1998-1994

Characterization of supporting data set(s): The National Health and Nutrition Examination Survey (NHANES) is comprised of a series of surveys conducted by the Centers for Disease Control's (CDC) National Center for Health Statistics (NCHS). The survey is designed to collect data on the health of the United States population, including information about many topics, such as nutrition, heart disease, and exposure to chemicals (CDC, 2001). The NHANES surveys have been performed over a number of years. The first survey, NHANES I, took place from 1971 through 1975; NHANES II occurred from 1976-80; NHANES III was performed in 1988 through 1994; and the current NHANES began in 1999 and is ongoing. As part of the survey, blood and urine samples were collected to measure the amounts of certain chemicals thought to be harmful to people. Because of the extensive work involved with laboratory analyses, some chemicals were measured for all people in the survey, while other chemicals were only measured for a small sample of people in an age group. The current NHANES IV measures exposure for 27 chemicals for people in the U.S. In previous NHANES, exposure had been assessed via laboratory analysis for only three chemicals: lead, cadmium and cotinine.

Indicator source (project, program, organization, report): NHANES III, 1999. *The CDC National Report on Human Exposure to Environmental Chemicals* (often referred to as the "CDC Report Card") summarizes chemical exposure data from the 1999 NHANES.

Web site: http://www.cdc.gov/nchs/nhanes.htm

Indicator name: Chronic obstructive pulmonary disease mortality

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends for cancer, cardiovascular disease, chronic obstructive pulmonary disease and asthma?

Spatial coverage: National. Data are for the 50 states and the District of Columbia, unless otherwise specified.

Temporal coverage: 1933 to present; 1980-1998 data displayed.

Characterization of supporting data set(s): National Center for Health Statistics (NCHS), through the National Vital Statistics Systems (NVSS), has collected and published data on births, deaths, marriages, and divorces in the United States. Virtually all births and deaths are registered. U.S. Standard Live Birth and Death Certificates are revised periodically. Most state certificates conform closely in content and arrangement to the standard certificate recommended by NCHS and all certificates contain a minimum data set specified by NCHS. The mother provides demographic information on the birth certificate, such as race and ethnicity, at the time of birth. Medical and health information is based on hospital records. Demographic information on the death certificate is provided by the funeral director based on information supplied by an informant. A physician, medical examiner, or coroner provides medical certification of cause of death.

Indicator source (project, program, organization, report): NCHS, NVSS

Web site: http://www.cdc.gov/nchs/nvss.htm

Indicator name: Asthma mortality

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends for cancer, cardiovascular disease, chronic obstructive pulmonary disease and asthma?

Spatial coverage: National. Data are for the 50 states and the District of Columbia, unless otherwise specified.

Temporal coverage: 1933 to present; 1980-1999 data displayed

Characterization of supporting data set(s): National Center for Health Statistics (NCHS), through the National Vital Statistics Systems (NVSS), has collected and published data on births, deaths, marriages, and divorces in the United States. Virtually all births and deaths are registered. U.S. Standard Live Birth and Death Certificates are revised periodically. Most state certificates conform closely in content and arrangement to the standard certificate recommended by NCHS and all certificates contain a minimum data set specified by NCHS. The mother provides demographic information on the birth certificate, such as race and ethnicity, at the time of birth. Medical and health information is based on hospital records. Demographic information on the death certificate is provided by the funeral director based on information supplied by an informant. A physician, medical examiner, or coroner provides medical certification of cause of death.

Indicator source (project, program, organization, report): NCHS, NVSS

Web site: http://www.cdc.gov/nchs/nvss.htm

Indicator name: Asthma prevalence

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends for cancer, cardiovascular disease, chronic obstructive pulmonary disease and asthma?

Spatial coverage: National

Temporal coverage: NHIS has been conducted continuously since 1957, the content of the survey has been updated about every 10-15 years. In 1996 a substantially revised NHIS content began field testing. This new questionnaire, described in detail below, began in 1997 and improves the ability of the NHIS to provide important health information. 1980-1996 and 1980-1999 data displayed.

Characterization of supporting data set(s): The National Health Interview Survey (NHIS) is a continuous nationwide survey in which data are collected through personal household interviews. Self-reported information is obtained on personal and demographic characteristics, illnesses, injuries, impairments, chronic conditions, utilization of health resources, and other health topics. The sample scheduled for each week is representative of the target population, and the weekly samples are additive over time. Response rates for special health topics (supplements) have generally been lower. Because of the extensive redesign of the questionnaire in 1997 and introduction of the computer-assisted personal interviewing (CAPI) method of data collection, data from 1997 and later years may not be comparable with earlier years.

Indicator source (project, program, organization, report): National Center for Health Statistics (NCHS), National Health Interview Survey (NHIS)

Web site: http://www.cdc.gov/nchs/nhis.htm

Indicator name: Cholera prevalence

Indicator type (status or trend): Trend

Indicator category (1 or 2): 2

Associated question: What are the trends for gastrointestinal illnesses?

Spatial coverage: National

Temporal coverage: 1997-2001

Characterization of supporting data set(s): The purpose of the National Notifiable Disease Surveillance System is primarily to provide weekly provisional information on the occurrence of diseases defined as notifiable by the Council of State and Territorial Epidemiologists (CSTE) and annual summary data. State epidemiologists report cases of notifiable diseases to CDC, and CDC tabulates and publishes these data in the *Morbidity and Mortality Weekly Report (MMWR)* and the *Summary of Notifiable Diseases, United States*. Policies for reporting notifiable disease cases can vary by disease or reporting jurisdiction. CSTE and CDC annually review and recommend additions or deletions to the list or nationally notifiable diseases based on the need to respond to emerging priorities. However, reporting nationally notifiable diseases to CDC is voluntary. Reporting is currently mandated by law or regulation only at the local and state level. Therefore, the list of diseases that are considered notifiable varies slightly by state. Notifiable disease data are useful for analyzing disease trends and determining relative disease burdens. However, these data must be interpreted in light of reporting practices. The degree of completeness of data reporting also is influenced by the diagnostic facilities available, the control measures in effect, public awareness of a specific disease, and the interests, resources, and priorities of state and local officials responsible for disease control and public health surveillance, introduction of new diagnostic tests, or discovery of

new disease entities can cause changes in disease reporting that are independent of the true incidence of disease.

Indicator source (project, program, organization, report): Centers for Disease Control and Prevention, Epidemiology Program Office, National Notifiable Disease Surveillance System

Web site: *Morbidity and Mortality Weekly Report* http://www.cdc.gov/mmwr/; *Summary of Notifiable Diseases* http://www.cdc.gov/epo/dphsi/annsum/

Indicator name: Cryptosporidiosis prevalence

Indicator type (status or trend): Trend

Indicator category (1 or 2): 2

Associated question: What are the trends for gastrointestinal illnesses?

Spatial coverage: National

Temporal coverage: 1997-2001

Characterization of supporting data set(s): The purpose of the National Notifiable Disease Surveillance System is primarily to provide weekly provisional information on the occurrence of diseases defined as notifiable by the Council of State and Territorial Epidemiologists (CSTE) and annual summary data. State epidemiologists report cases of notifiable diseases to CDC, and CDC tabulates and publishes these data in the *Morbidity and Mortality Weekly Report (MMWR)* and the *Summary of Notifiable Diseases, United States*. Policies for reporting notifiable disease cases can vary by disease or reporting jurisdiction. CSTE and CDC annually review and recommend additions or deletions to the list or nationally notifiable diseases based on the need to respond to emerging priorities. However, reporting nationally notifiable diseases to CDC is voluntary. Reporting is currently mandated by law or regulation only at the local and state level. Therefore, the list of diseases that are considered notifiable varies slightly by state. Notifiable disease data are useful for analyzing disease trends and determining relative disease burdens. However, these data must be interpreted in light of reporting practices. The degree of completeness of data reporting also is influenced by the diagnostic facilities available, the control measures in effect, public awareness of a specific disease, and the interests, resources, and priorities of state and local officials responsible for disease control and public health surveillance, introduction of new diagnostic tests, or discovery of new disease entities can cause changes in disease reporting that are independent of the true incidence of disease.

Indicator source (project, program, organization, report): Centers for Disease Control and Prevention, Epidemiology Program Office, National Notifiable Disease Surveillance System

Web site: *Morbidity and Mortality Weekly Report* http://www.cdc.gov/mmwr/;

Summary of Notifiable Diseases http://www.cdc.gov/epo/dphsi/annsum/

Indicator name: *E. coli* 0157:H7 prevalence

Indicator type (status or trend): Trend

Indicator category (1 or 2): 2

Associated question: What are the trends for gastrointestinal illnesses?

Spatial coverage: National

Temporal coverage: 1997-2001

Characterization of supporting data set(s): The purpose of the National Notifiable Disease Surveillance System is primarily to provide weekly provisional information on the occurrence of diseases defined as notifiable by the Council of State and Territorial Epidemiologists (CSTE) and annual summary data. State epidemiologists report cases of notifiable diseases to CDC, and CDC tabulates and publishes these data in the *Morbidity and Mortality Weekly Report (MMWR)* and the *Summary of Notifiable Diseases, United States*. Policies for reporting notifiable disease cases can vary by disease or reporting jurisdiction. CSTE and CDC annually review and recommend additions or deletions to the list or nationally notifiable diseases based on the need to respond to emerging priorities. However, reporting nationally notifiable diseases to CDC is voluntary. Reporting is currently mandated by law or regulation only at the local and state level. Therefore, the list of diseases that are considered notifiable varies slightly by state. Notifiable disease data are useful for analyzing disease trends and determining relative disease burdens. However, these data must be interpreted in light of reporting practices. The degree of completeness of data reporting also is influenced by the diagnostic facilities available, the control measures in effect, public awareness of a specific disease, and the interests, resources, and priorities of state and local officials responsible for disease control and public health surveillance, introduction of new diagnostic tests, or discovery of new disease entities can cause changes in disease reporting that are independent of the true incidence of disease.

Indicator source (project, program, organization, report): Centers for Disease Control and Prevention, Epidemiology Program Office, National Notifiable Disease Surveillance System

Web site: *Morbidity and Mortality Weekly Report* http://www.cdc.gov/mmwr/; *Summary of Notifiable Diseases* http://www.cdc.gov/epo/dphsi/annsum/

Indicator name: Hepatitis A prevalence

Indicator type (status or trend): Trend

Indicator category (1 or 2): 2

Associated question: What are the trends for gastrointestinal illnesses?

Spatial coverage: National

Temporal coverage: 1997-2001

Characterization of supporting data set(s): The purpose of the National Notifiable Disease Surveillance System is primarily to provide weekly provisional information on the occurrence of diseases defined as notifiable by the Council of State and Territorial Epidemiologists (CSTE) and annual summary data. State epidemiologists report cases of notifiable diseases to CDC, and CDC tabulates and publishes these data in the *Morbidity and Mortality Weekly Report (MMWR)* and the *Summary of Notifiable Diseases, United States*. Policies for reporting notifiable disease cases can vary by disease or reporting jurisdiction. CSTE and CDC annually review and recommend additions or deletions to the list or nationally notifiable diseases based on the need to respond to emerging priorities. However, reporting nationally notifiable diseases to CDC is voluntary. Reporting is currently mandated by law or regulation only at the local and state level. Therefore, the list of diseases that are considered notifiable varies slightly by state. Notifiable disease data are useful for analyzing disease trends and determining relative disease burdens. However, these data must be interpreted in light of reporting practices. The degree of completeness of data reporting also is influenced by the diagnostic facilities available, the control measures in effect, public awareness of a specific disease, and the interests, resources, and priorities of state and local officials responsible for disease control and public health surveillance, introduction of new diagnostic tests, or discovery of new disease entities can cause changes in disease reporting that are independent of the true incidence of disease.

Indicator source (project, program, organization, report): Centers for Disease Control and Prevention, Epidemiology Program Office, National Notifiable Disease Surveillance System

Web site: *Morbidity and Mortality Weekly Report* http://www.cdc.gov/mmwr/; *Summary of Notifiable Diseases* http://www.cdc.gov/epo/dphsi/annsum/

Indicator name: Salmonellosis prevalence

Indicator type (status or trend): Trend

Indicator category (1 or 2): 2

Associated question: What are the trends for gastrointestinal illnesses?

Spatial coverage: National

Temporal coverage: 1997-2001

Characterization of supporting data set(s): The purpose of the National Notifiable Disease Surveillance System is primarily to

provide weekly provisional information on the occurrence of diseases defined as notifiable by the Council of State and Territorial Epidemiologists (CSTE) and annual summary data. State epidemiologists report cases of notifiable diseases to CDC, and CDC tabulates and publishes these data in the *Morbidity and Mortality Weekly Report (MMWR)* and the *Summary of Notifiable Diseases, United States*. Policies for reporting notifiable disease cases can vary by disease or reporting jurisdiction. CSTE and CDC annually review and recommend additions or deletions to the list or nationally notifiable diseases based on the need to respond to emerging priorities. However, reporting nationally notifiable diseases to CDC is voluntary. Reporting is currently mandated by law or regulation only at the local and state level. Therefore, the list of diseases that are considered notifiable varies slightly by state. Notifiable disease data are useful for analyzing disease trends and determining relative disease burdens. However, these data must be interpreted in light of reporting practices. The degree of completeness of data reporting also is influenced by the diagnostic facilities available, the control measures in effect, public awareness of a specific disease, and the interests, resources, and priorities of state and local officials responsible for disease control and public health surveillance, introduction of new diagnostic tests, or discovery of new disease entities can cause changes in disease reporting that are independent of the true incidence of disease.

Indicator source (project, program, organization, report): Centers for Disease Control and Prevention, Epidemiology Program Office, National Notifiable Disease Surveillance System

Web site: *Morbidity and Mortality Weekly Report* http://www.cdc.gov/mmwr/; *Summary of Notifiable Diseases* http://www.cdc.gov/epo/dphsi/annsum/

Indicator name: Shigellosis prevalence

Indicator type (status or trend): Trend

Indicator category (1 or 2): 2

Associated question: What are the trends for gastrointestinal illnesses?

Spatial coverage: National

Temporal coverage: 1997-2001

Characterization of supporting data set(s): The purpose of the National Notifiable Disease Surveillance System is primarily to provide weekly provisional information on the occurrence of diseases defined as notifiable by the Council of State and Territorial Epidemiologists (CSTE) and annual summary data. State epidemiologists report cases of notifiable diseases to CDC, and CDC tabulates and publishes these data in the *Morbidity and Mortality Weekly Report (MMWR)* and the *Summary of Notifiable Diseases, United States*. Policies for reporting notifiable disease cases can vary by disease or reporting jurisdiction. CSTE and CDC annually review

and recommend additions or deletions to the list or nationally notifiable diseases based on the need to respond to emerging priorities. However, reporting nationally notifiable diseases to CDC is voluntary. Reporting is currently mandated by law or regulation only at the local and state level. Therefore, the list of diseases that are considered notifiable varies slightly by state. Notifiable disease data are useful for analyzing disease trends and determining relative disease burdens. However, these data must be interpreted in light of reporting practices. The degree of completeness of data reporting also is influenced by the diagnostic facilities available, the control measures in effect, public awareness of a specific disease, and the interests, resources, and priorities of state and local officials responsible for disease control and public health surveillance, introduction of new diagnostic tests, or discovery of new disease entities can cause changes in disease reporting that are independent of the true incidence of disease.

Indicator source (project, program, organization, report): Centers for Disease Control and Prevention, Epidemiology Program Office, National Notifiable Disease Surveillance System

Web site: *Morbidity and Mortality Weekly Report* http://www.cdc.gov/mmwr/; *Summary of Notifiable Diseases* http://www.cdc.gov/epo/dphsi/annsum/

Indicator name: Typhoid fever prevalence

Indicator type (status or trend): Trend

Indicator category (1 or 2): 2

Associated question: What are the trends for gastrointestinal illnesses?

Spatial coverage: National

Temporal coverage: 1997-2001

Characterization of supporting data set(s): The purpose of the National Notifiable Disease Surveillance System is primarily to provide weekly provisional information on the occurrence of diseases defined as notifiable by the Council of State and Territorial Epidemiologists (CSTE) and annual summary data. State epidemiologists report cases of notifiable diseases to CDC, and CDC tabulates and publishes these data in the *Morbidity and Mortality Weekly Report (MMWR)* and the *Summary of Notifiable Diseases, United States*. Policies for reporting notifiable disease cases can vary by disease or reporting jurisdiction. CSTE and CDC annually review and recommend additions or deletions to the list or nationally notifiable diseases based on the need to respond to emerging priorities. However, reporting nationally notifiable diseases to CDC is voluntary. Reporting is currently mandated by law or regulation only at the local and state level. Therefore, the list of diseases that are considered notifiable varies slightly by state. Notifiable disease data are useful for analyzing disease trends and determining relative disease burdens. However, these data must be interpreted in light of

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Indicator source (project, program, organization, report): Centers for Disease Control and Prevention, Epidemiology Program Office, National Notifiable Disease Surveillance System

Web site: *Morbidity and Mortality Weekly Report* http://www.cdc.gov/mmwr/; *Summary of Notifiable Diseases* http://www.cdc.gov/epo/dphsi/annsum/

Indicator name: Infant mortality

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends for children's environmental health issues?

Spatial coverage: National. Data are for the 50 states and the District of Columbia, unless otherwise specified.

Temporal coverage: 1933 to present; 1999 data displayed

Characterization of supporting data set(s): National Center for Health Statistics (NCHS), through the National Vital Statistics Systems (NVSS), has collected and published data on births, deaths, marriages, and divorces in the United States. Virtually all births and deaths are registered. U.S. Standard Live Birth and Death Certificates are revised periodically. Most state certificates conform closely in content and arrangement to the standard certificate recommended by NCHS and all certificates contain a minimum data set specified by NCHS. The mother provides demographic information on the birth certificate, such as race and ethnicity, at the time of birth. Medical and health information is based on hospital records. Demographic information on the death certificate is provided by the funeral director based on information supplied by an informant. A physician, medical examiner, or coroner provides medical certification of cause of death.

Indicator source (project, program, organization, report): National Center for Health Statistics (NCHS), National Vital Statistics Systems (NVSS)

Web site: http://www.cdc.gov/nchs/nvss.htm

Indicator name: Low birthweight incidence

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends for children's environmental health issues?

Spatial coverage: National. Data are for the 50 states and the District of Columbia, unless otherwise specified.

Temporal coverage: 1933 to present; 1991-2000 data displayed.

Characterization of supporting data set(s): National Center for Health Statistics (NCHS), through the National Vital Statistics Systems (NVSS), has collected and published data on births, deaths, marriages, and divorces in the United States. Virtually all births and deaths are registered. U.S. Standard Live Birth and Death Certificates are revised periodically. Most state certificates conform closely in content and arrangement to the standard certificate recommended by NCHS and all certificates contain a minimum data set specified by NCHS. The mother provides demographic information on the birth certificate, such as race and ethnicity, at the time of birth. Medical and health information is based on hospital records. Demographic information on the death certificate is provided by the funeral director based on information supplied by an informant. A physician, medical examiner, or coroner provides medical certification of cause of death.

Indicator source (project, program, organization, report): National Center for Health Statistics (NCHS), National Vital Statistics Systems (NVSS)

Web site: http://www.cdc.gov/nchs/nvss/htm

Indicator name: Childhood cancer mortality

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends for children's environmental health issues?

Spatial coverage: National. Data are for the 50 states and the District of Columbia, unless otherwise specified.

Temporal coverage: 1933 to present; 1994-1998 data displayed.

Characterization of supporting data set(s): National Center for Health Statistics (NCHS), through the National Vital Statistics Systems (NVSS), has collected and published data on births, deaths, marriages, and divorces in the United States. Virtually all births and deaths are registered. U.S. Standard Live Birth and Death Certificates are revised periodically. Most state certificates conform closely in content and arrangement to the standard certificate recommended by NCHS and all certificates contain a minimum data set specified by NCHS. The mother provides demographic information on the birth certificate, such as race and ethnicity, at the time of birth. Medical and health information is based on hospital records. Demographic information on the death certificate is provided by the funeral director based on information supplied by an informant. A physician,

medical examiner, or coroner provides medical certification of cause of death.

Indicator source (project, program, organization, report): National Center for Health Statistics (NCHS), National Vital Statistics Systems (NVSS)

Web site: http://www.cdc.gov/nchs/nvss.htm

Indicator name: Childhood cancer incidence

Indicator type (status or trend): Trend

Indicator category (1 or 2): 2

Associated question: What are the trends for children's environmental health issues?

Spatial coverage: Eleven Standard Metropolitan Statistical Areas (SMSAs) amounting to fourteen percent of the U.S. population.

Temporal coverage: 1973 to present; 1975-1998 data displayed.

Characterization of supporting data set(s): The Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute is a source of information on cancer incidence and survival in the United States. The SEER Program began on January 1, 1973. NCI contracts with 11 population-based registries that cover eleven SMSAs (and three supplemental registries) within the United States to provide data on all residents diagnosed with cancer during each year and to provide current followup information on all previously diagnosed patients. The SEER Program covers approximately 14 percent of the U.S. population. The SEER Program is the only comprehensive source of population-based information in the United States that includes stage of cancer at the time of diagnosis and survival rates within each stage.

Indicator source (project, program, organization, report): National Institutes of Health (NIH), NCI, SEER

Web site: http://seer.cancer.gov

Indicator name: Childhood asthma mortality

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends for children's environmental health issues?

Spatial coverage: National. Data are for the 50 states and the District of Columbia, unless otherwise specified.

Temporal coverage: 1933 to present

Characterization of supporting data set(s): National Center for Health Statistics (NCHS), through the National Vital Statistics Systems (NVSS), has collected and published data on births, deaths,

marriages, and divorces in the United States. Virtually all births and deaths are registered. U.S. Standard Live Birth and Death Certificates are revised periodically. Most state certificates conform closely in content and arrangement to the standard certificate recommended by NCHS and all certificates contain a minimum data set specified by NCHS. The mother provides demographic information on the birth certificate, such as race and ethnicity, at the time of birth. Medical and health information is based on hospital records. Demographic information on the death certificate is provided by the funeral director based on information supplied by an informant. A physician, medical examiner, or coroner provides medical certification of cause of death.

Indicator source (project, program, organization, report): National Center for Health Statistics (NCHS), National Vital Statistics Systems (NVSS)

Web site: http://www.cdc.gov/nchs/nvss.htm

Indicator name: Childhood asthma prevalence

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends for children's environmental health issues?

Spatial coverage: National

Temporal coverage: NHIS has been conducted continuously since 1957, the content of the survey has been updated about every 10-15 years. In 1996 a substantially revised NHIS content began field testing. This new questionnaire, described in detail below, began in 1997 and improves the ability of the NHIS to provide important health information. 1980-2001 data displayed.

Characterization of supporting data set(s): The National Health Interview Survey (NHIS) is a continuous nationwide survey in which data are collected through personal household interviews. Self-reported information is obtained on personal and demographic characteristics, illnesses, injuries, impairments, chronic conditions, utilization of health resources, and other health topics. The sample scheduled for each week is representative of the target population, and the weekly samples are additive over time. Response rates for special health topics (supplements) have generally been lower. Because of the extensive redesign of the questionnaire in 1997 and introduction of the computer-assisted personal interviewing (CAPI) method of data collection, data from 1997 and later years may not be comparable with earlier years.

Indicator source (project, program, organization, report): National Center for Health Statistics (NCHS), National Health Interview Survey (NHIS)

Web site: http://www.cdc.gov/nchs/nhis.htm

Indicator name: Deaths due to birth defects

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends for children's environmental health issues?

Spatial coverage: National. Data are for the 50 states and the District of Columbia, unless otherwise specified.

Temporal coverage: 1933 to present.

Characterization of supporting data set(s): National Center for Health Statistics (NCHS), through the National Vital Statistics Systems (NVSS), has collected and published data on births, deaths, marriages, and divorces in the United States. Virtually all births and deaths are registered. U.S. Standard Live Birth and Death Certificates are revised periodically. Most state certificates conform closely in content and arrangement to the standard certificate recommended by NCHS and all certificates contain a minimum data set specified by NCHS. The mother provides demographic information on the birth certificate, such as race and ethnicity, at the time of birth. Medical and health information is based on hospital records. Demographic information on the death certificate is provided by the funeral director based on information supplied by an informant. A physician, medical examiner, or coroner provides medical certification of cause of death.

Indicator source (project, program, organization, report): National Center for Health Statistics (NCHS), National Vital Statistics Systems (NVSS)

Web site: http://www.cdc.gov/nchs/nvss.htm

Indicator name: Birth defect incidence

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends for children's environmental health issues?

Spatial coverage: National. Data are for the 50 states and the District of Columbia, unless otherwise specified.

Temporal coverage: 1933 to present; 2000 data displayed.

Characterization of supporting data set(s): National Center for Health Statistics (NCHS), through the National Vital Statistics Systems (NVSS), has collected and published data on births, deaths, marriages, and divorces in the United States. Virtually all births and deaths are registered. U.S. Standard Live Birth and Death Certificates are revised periodically. Most state certificates conform closely in content and arrangement to the standard certificate recommended by NCHS and all certificates contain a minimum data set specified by NCHS. The mother provides demographic information on the birth certificate, such as race and ethnicity, at the time of birth. Medical

and health information is based on hospital records. Demographic information on the death certificate is provided by the funeral director based on information supplied by an informant. A physician, medical examiner, or coroner provides medical certification of cause of death.

Indicator source (project, program, organization, report): National Center for Health Statistics (NCHS), National Vital Statistics Systems (NVSS)

Web site: http://www.cdc.gov/nchs/nvss.htm

Measuring Exposure to Environmental Pollution: Indicators and Trends

Indicator name: Blood lead level

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What is the level of exposure to heavy metals?

Spatial coverage: National

Temporal coverage: NHANES 1999-2000

Characterization of supporting data set(s): The National Health and Nutrition Examination Survey (NHANES) is comprised of a series of surveys conducted by the Centers for Disease Control's (CDC) National Center for Health Statistics (NCHS). The survey is designed to collect data on the health of the United States population, including information about many topics, such as nutrition, heart disease, and exposure to chemicals (CDC, 2001). The NHANES surveys have been performed over a number of years. The first survey, NHANES I, took place from 1971 through 1975; NHANES II occurred from 1976-80; NHANES III was performed in 1988 through 1994; and the current NHANES began in 1999 and is ongoing. As part of the survey, blood and urine samples were collected to measure the amounts of certain chemicals thought to be harmful to people. Because of the extensive work involved with laboratory analyses, some chemicals were measured for all people in the survey, while other chemicals were only measured for a small sample of people in an age group. The current NHANES IV measures exposure for 27 chemicals for people in the U.S. In previous NHANES, exposure had been assessed via laboratory analysis for only three chemicals: lead, cadmium and cotinine.

Indicator source (project, program, organization, report): National Health and Nutrition Examination Survey (NHANES), 1999. *The CDC National Report on Human Exposure to Environmental Chemicals* (often referred to as the "CDC Report Card") summarizes chemical exposure data from the 1999 NHANES.

Web site: http://www.cdc.gov/nchs/nhanes.htm

Indicator name: Urine arsenic level

Indicator type (status or trend): Trend

Indicator category (1 or 2): 2

Associated question: What is the level of exposure to heavy metals?

Spatial coverage: NHEXAS-Region 5

Temporal coverage: 1999

Characterization of supporting data set(s): The National Human Exposure Assessment Survey (NHEXAS) was developed by the Office of Research and Development (ORD) of the U.S. Environmental Protection Agency (EPA) early in the 1990s to provide critical information about multipathway, multimedia population exposure distribution to chemical classes. Phase 1 of NHEXAS consisted of demonstration and scoping studies in Maryland, Phoenix, Arizona, and EPA Region 5 using probability- based sampling designs. Although the study was conducted in three different regions of the U.S., it was not designed to be nationally representative. The Region 5 study was conducted in Ohio, Michigan, Illinois, Indiana, Wisconsin, and Minnesota, and measured metals and volatile organic chemicals (VOCs).

Indicator source (project, program, organization, report): 1) NHEXAS-Region 5; 2) National Research Council. Arsenic in Drinking Water. Washington, DC: National Academies Press, 1999.

Web site: *NHEXAS* http://www.epa.gov/nerl/research/nhexas/nhexas.htm; *NHEXAS data in EPA's Human Exposure Database System* http://www.epa.gov/heds/

Indicator name: Blood mercury level

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What is the level of exposure to heavy metals?

Spatial coverage: National

Temporal coverage: NHANES, 1999-2000

Characterization of supporting data set(s): The National Health and Nutrition Examination Survey (NHANES) is comprised of a series of surveys conducted by the Centers for Disease Control's (CDC) National Center for Health Statistics (NCHS). The survey is designed to collect data on the health of the United States population, including information about many topics, such as nutrition, heart disease, and exposure to chemicals (CDC, 2001). The NHANES surveys have been performed over a number of years. The first survey, NHANES I, took place from 1971 through 1975; NHANES II occurred from 1976-80; NHANES III was performed in 1988 through 1994; and the current NHANES began in 1999 and is ongoing. As part of the survey, blood and urine samples were collected to measure the amounts of certain chemicals thought to be harmful to people. Because of the extensive work involved with

laboratory analyses, some chemicals were measured for all people in the survey, while other chemicals were only measured for a small sample of people in an age group. The current NHANES IV measures exposure for 27 chemicals for people in the U.S. In previous NHANES, exposure had been assessed via laboratory analysis for only three chemicals: lead, cadmium and cotinine.

Indicator source (project, program, organization, report): National Health and Nutrition Examination Survey (NHANES), 1999. *The CDC National Report on Human Exposure to Environmental Chemicals* (often referred to as the "CDC Report Card") summarizes chemical exposure data from the 1999 NHANES.

Web site: http://www.cdc.gov/nchs/nhanes.htm

Indicator name: Blood cadmium level

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What is the level of exposure to heavy metals?

Spatial coverage: National

Temporal coverage: NHANES, 1999-2000

Characterization of supporting data set(s): The National Health and Nutrition Examination Survey (NHANES) is comprised of a series of surveys conducted by the Centers for Disease Control's (CDC) National Center for Health Statistics (NCHS). The survey is designed to collect data on the health of the United States population, including information about many topics, such as nutrition, heart disease, and exposure to chemicals (CDC, 2001). The NHANES surveys have been performed over a number of years. The first survey, NHANES I, took place from 1971 through 1975; NHANES II occurred from 1976-80; NHANES III was performed in 1988 through 1994; and the current NHANES began in 1999 and is ongoing. As part of the survey, blood and urine samples were collected to measure the amounts of certain chemicals thought to be harmful to people. Because of the extensive work involved with laboratory analyses, some chemicals were measured for all people in the survey, while other chemicals were only measured for a small sample of people in an age group. The current NHANES IV measures exposure for 27 chemicals for people in the U.S. In previous NHANES, exposure had been assessed via laboratory analysis for only three chemicals: lead, cadmium and cotinine.

Indicator source (project, program, organization, report): National Health and Nutrition Examination Survey (NHANES), 1999. *The CDC National Report on Human Exposure to Environmental Chemicals* (often referred to as the "CDC Report Card") summarizes chemical exposure data from the 1999 NHANES.

Web site: http://www.cdc.gov/nchs/nhanes.htm

Indicator name: Blood cotinine level

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What is the level of exposure to cotinine?

Spatial coverage: National

Temporal coverage: NHANES, 1999-2000

Characterization of supporting data set(s): The National Health and Nutrition Examination Survey (NHANES) is comprised of a series of surveys conducted by the Centers for Disease Control's (CDC) National Center for Health Statistics (NCHS). The survey is designed to collect data on the health of the United States population, including information about many topics, such as nutrition, heart disease, and exposure to chemicals (CDC, 2001). The NHANES surveys have been performed over a number of years. The first survey, NHANES I, took place from 1971 through 1975; NHANES II occurred from 1976-80; NHANES III was performed in 1988 through 1994; and the current NHANES began in 1999 and is ongoing. As part of the survey, blood and urine samples were collected to measure the amounts of certain chemicals thought to be harmful to people. Because of the extensive work involved with laboratory analyses, some chemicals were measured for all people in the survey, while other chemicals were only measured for a small sample of people in an age group. The current NHANES IV measures exposure for 27 chemicals for people in the U.S. In previous NHANES, exposure had been assessed via laboratory analysis for only three chemicals: lead, cadmium and cotinine.

Indicator source (project, program, organization, report): National Health and Nutrition Examination Survey (NHANES)

Web site: http://www.cdc.gov/nchs/nhanes.htm

Indicator name: Blood volatile organic compound levels

Indicator type (status or trend):

Indicator category (1 or 2): 1

Associated question: What is the level of exposure to volatile organic compounds?

Spatial coverage: National

Temporal coverage: NHANES III (1988-1994)

Characterization of supporting data set(s): The National Health and Nutrition Examination Survey (NHANES) is comprised of a series of surveys conducted by the Centers for Disease Control's (CDC) National Center for Health Statistics (NCHS). The survey is designed to collect data on the health of the United States population, including information about many topics, such as nutrition, heart disease, and exposure to chemicals (CDC, 2001). The NHANES surveys have been performed over a number of years. The first survey, NHANES I, took place from 1971 through 1975; NHANES II occurred from 1976-80; NHANES III was performed in

1988 through 1994; and the current NHANES began in 1999 and is ongoing. As part of the survey, blood and urine samples were collected to measure the amounts of certain chemicals thought to be harmful to people. Because of the extensive work involved with laboratory analyses, some chemicals were measured for all people in the survey, while other chemicals were only measured for a small sample of people in an age group. The current NHANES IV measures exposure for 27 chemicals for people in the U.S. In previous NHANES, exposure had been assessed via laboratory analysis for only three chemicals: lead, cadmium and cotinine.

Indicator source (project, program, organization, report): National Health and Nutrition Examination Survey (NHANES), 1999. *The CDC National Report on Human Exposure to Environmental Chemicals* (often referred to as the "CDC Report Card") summarizes chemical exposure data from the 1999 NHANES.

Web site: http://www.cdc.gov/nchs/nhanes.htm

Indicator name: Urine organophosphate levels to indicate pesticides

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What is the level of exposure to pesticides?

Spatial coverage: National

Temporal coverage: NHANES, 1999-2000

Characterization of supporting data set(s): The National Health and Nutrition Examination Survey (NHANES) is comprised of a series of surveys conducted by the Centers for Disease Control's (CDC) National Center for Health Statistics (NCHS). The survey is designed to collect data on the health of the United States population, including information about many topics, such as nutrition, heart disease, and exposure to chemicals (CDC, 2001). The NHANES surveys have been performed over a number of years. The first survey, NHANES I, took place from 1971 through 1975; NHANES II occurred from 1976-80; NHANES III was performed in 1988 through 1994; and the current NHANES began in 1999 and is ongoing. As part of the survey, blood and urine samples were collected to measure the amounts of certain chemicals thought to be harmful to people. Because of the extensive work involved with laboratory analyses, some chemicals were measured for all people in the survey, while other chemicals were only measured for a small sample of people in an age group. The current NHANES IV measures exposure for 27 chemicals for people in the U.S. In previous NHANES, exposure had been assessed via laboratory analysis for only three chemicals: lead, cadmium and cotinine.

Indicator source (project, program, organization, report): National Health and Nutrition Examination Survey (NHANES), 1999. *The CDC National Report on Human Exposure to Environmental Chemicals* (often referred to as the "CDC Report Card") summarizes chemical exposure data from the 1999 NHANES.

Web site: http://www.cdc.gov/nchs/nhanes.htm

Indicator name: Blood lead level in children

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends in exposure to environmental contaminants for children?

Spatial coverage: National

Temporal coverage: NHANES, 1999-2000

Characterization of supporting data set(s): The National Health and Nutrition Examination Survey (NHANES) is comprised of a series of surveys conducted by the Centers for Disease Control's (CDC) National Center for Health Statistics (NCHS). The survey is designed to collect data on the health of the United States population, including information about many topics, such as nutrition, heart disease, and exposure to chemicals (CDC, 2001). The NHANES surveys have been performed over a number of years. The first survey, NHANES I, took place from 1971 through 1975; NHANES II occurred from 1976-80; NHANES III was performed in 1988 through 1994; and the current NHANES began in 1999 and is ongoing. As part of the survey, blood and urine samples were collected to measure the amounts of certain chemicals thought to be harmful to people. Because of the extensive work involved with laboratory analyses, some chemicals were measured for all people in the survey, while other chemicals were only measured for a small sample of people in an age group. The current NHANES IV measures exposure for 27 chemicals for people in the U.S. In previous NHANES, exposure had been assessed via laboratory analysis for only three chemicals: lead, cadmium and cotinine.

Indicator source (project, program, organization, report): National Health and Nutrition Examination Survey (NHANES), 1999. *The CDC National Report on Human Exposure to Environmental Chemicals* (often referred to as the "CDC Report Card") summarizes chemical exposure data from the 1999 NHANES.

Web site: http://www.cdc.gov/nchs/nhanes.htm

Indicator name: Blood mercury level in children

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends in exposure to environmental contaminants for children?

Spatial coverage: National

Temporal coverage: NHANES, 1999-2000

Characterization of supporting data set(s): The National Health and Nutrition Examination Survey (NHANES) is comprised of a series

of surveys conducted by the Centers for Disease Control's (CDC) National Center for Health Statistics (NCHS). The survey is designed to collect data on the health of the United States population, including information about many topics, such as nutrition, heart disease, and exposure to chemicals (CDC, 2001). The NHANES surveys have been performed over a number of years. The first survey, NHANES I, took place from 1971 through 1975; NHANES II occurred from 1976-80; NHANES III was performed in 1988 through 1994; and the current NHANES began in 1999 and is ongoing. As part of the survey, blood and urine samples were collected to measure the amounts of certain chemicals thought to be harmful to people. Because of the extensive work involved with laboratory analyses, some chemicals were measured for all people in the survey, while other chemicals were only measured for a small sample of people in an age group. The current NHANES IV measures exposure for 27 chemicals for people in the U.S. In previous NHANES, exposure had been assessed via laboratory analysis for only three chemicals: lead, cadmium and cotinine.

Indicator source (project, program, organization, report): National Health and Nutrition Examination Survey (NHANES), 1999. *The CDC National Report on Human Exposure to Environmental Chemicals* (often referred to as the "CDC Report Card") summarizes chemical exposure data from the 1999 NHANES.

Web site: http://www.cdc.gov/nchs/nhanes.htm

Indicator name: Blood cotinine level in children

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What are the trends in exposure to environmental contaminants for children?

Spatial coverage: National

Temporal coverage: NHANES, 1999-2000

Characterization of supporting data set(s): 1) The National Health and Nutrition Examination Survey (NHANES) is comprised of a series of surveys conducted by the Centers for Disease Control's (CDC) National Center for Health Statistics (NCHS). The survey is designed to collect data on the health of the United States population, including information about many topics, such as nutrition, heart disease, and exposure to chemicals (CDC, 2001). The NHANES surveys have been performed over a number of years. The first survey, NHANES I, took place from 1971 through 1975; NHANES II occurred from 1976-80; NHANES III was performed in 1988 through 1994; and the current NHANES began in 1999 and is ongoing. As part of the survey, blood and urine samples were collected to measure the amounts of certain chemicals thought to be harmful to people. Because of the extensive work involved with laboratory analyses, some chemicals were measured for all people in the survey, while other chemicals were only measured for a small sample of people in an age group. The current NHANES IV measures

exposure for 27 chemicals for people in the U.S. In previous NHANES, exposure had been assessed via laboratory analysis for only three chemicals: lead, cadmium and cotinine.

Indicator source (project, program, organization, report): National Health and Nutrition Examination Survey (NHANES)

Web site: http://www.cdc.gov/nchs/nhanes.htm

Chapter 5: Ecological Condition

Forests

Indicator name: Extent of area by forest type

Indicator type (status or trend): Status

Indicator Category: 1

Associated question: What is the ecological condition of forests?

Spatial coverage: Lower 48 states

Temporal coverage: 1963-1997. Data from late 1940s to present. Data since 1953 provided with a reliability of ± 3-10 percent per 1 million acres (67 percent confidence limit). FIA provides updates of assessment data every five years.

Characterization of supporting data set(s): The USDA Forest Service Forest Inventory and Analysis (FIA) program is a survey-based program that has operated since the late 1940s, collecting information on a variety of forest characteristics. FIA has used a two-phase sample (generally, double sampling for stratification) to collect information on the nation's forests. Phase one establishes a large number of samples (more than 4 million, roughly every 0.6 miles). These are selected using aerial photographs or other remote-sensing images, which are then interpreted for various forest attributes. Phase two establishes a subset of approximately 450,000 phase-one points (roughly every 3 miles) for ground sampling. About 125,000 of these samples are permanently established on forest land. The forest characteristics measured include ownership, protection status, species composition, stand age and structure, tree growth, occurrences of mortality and removals, tree biomass, incidences of pathogens, natural and human-caused disturbances, and soil descriptors (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): Smith, W.B., J.S. Vissage, D.R. Darr, and R.M. Sheffield. *Forest Statistics of the United States, 1997*, General Technical Report NC-219. St. Paul, MN: U.S. Department of Agriculture Forest Service, North Central Research Station, 2001. Presented in *The State of the Nation's Ecosystems*, pages 118 and 240 (The Heinz Center, 2002).

Web site: http://fia.fs.fed.us

Indicator name: Forest age class

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: What is the ecological condition of forests?

Spatial coverage: National, all 50 states

Temporal coverage: 1997. Data from late 1940s to present. Data since 1953 provided with a reliability of ± 3-10 percent per 1 million acres (67 percent confidence limit). FIA provides updates of assessment data every five years.

Characterization of supporting data set(s): The USDA Forest Service Forest Inventory and Analysis (FIA) program is a survey-based program that has operated since the late 1940s, collecting information on a variety of forest characteristics. FIA has used a two-phase sample (generally, double sampling for stratification) to collect information on the nation's forests. Phase one establishes a large number of samples (more than 4 million, roughly every 0.6 miles). These are selected using aerial photographs or other remote-sensing images, which are then interpreted for various forest attributes. Phase two establishes a subset of approximately 450,000 phase-one points (roughly every 3 miles) for ground sampling. About 125,000 of these samples are permanently established on forest land. The forest characteristics measured include ownership, protection status, species composition, stand age and structure, tree growth, occurrences of mortality and removals, tree biomass, incidences of pathogens, natural and human-caused disturbances, and soil descriptors (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): Smith, W.B., J. Vissage, D. Darr, and R. Sheffield. *Forest Statistics of the United States, 1997*. U.S. Department of Agriculture, U.S. Forest Service, General Technical Report NC-219. St. Paul, MN: USDA, Forest Service. 2001. Presented in *The State of the Nation's Ecosystems*, pages 126 and 242 (The Heinz Center, 2002).

Web site: http://fia.fs.fed.us

Indicator name: Forest pattern and fragmentation

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: What is the ecological condition of forests?

Spatial coverage: Lower 48 states

Temporal coverage: 1992 satellite imagery and data from late 1940s to present. Data since 1953 provided with a reliability of ± 3-10 percent per 1 million acres (67 percent confidence limit). FIA provides updates of assessment data every five years.

Characterization of supporting data set(s): 1) The Multi-Resolution Land Characterization (MRLC) Consortium's National Land Cover Dataset (NLCD) provides a consistent, uniform, spatially explicit description of general land cover/land use across the continental U.S. at a 30-meter resolution. It does not contain habitat types. 2) The USDA Forest Service Forest Inventory and Analysis (FIA) program is a survey-based program that has operated

since the late 1940s, collecting information on a variety of forest characteristics. FIA has used a two-phase sample (generally, double sampling for stratification) to collect information on the nation's forests. Phase one establishes a large number of samples (more than 4 million, roughly every 0.6 miles). These are selected using aerial photographs or other remote-sensing images, which are then interpreted for various forest attributes. Phase two establishes a subset of approximately 450,000 phase-one points (roughly every 3 miles) for ground sampling. About 125,000 of these samples are permanently established on forest land. The forest characteristics measured include ownership, protection status, species composition, stand age and structure, tree growth, occurrences of mortality and removals, tree biomass, incidences of pathogens, natural and human-caused disturbances, and soil descriptors (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): 1)Multi-Resolution Land Characterization Consortium (MRLC) - National Land Cover Data (NLCD); 2) Conkling, B., J. Coulston, and M. Ambrose (eds.). *Forest Health Monitoring National Technical Report 1991-1999*, Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station, 2002; 3) Riiters, K.H., J.D. Wickham, R.V. O'Neill, K.B. Jones, E.R. Smith, J.W. Coulston, T.G. Wade, and J.H. Smith. Fragmentation of Continental United States Forests. *Ecosystems* 5: 815-822 (2002). Presented in *The State of the Nation's Ecosystems*, pages 120-121 and 240 (The Heinz Center, 2002).

Web sites: *MRLC* http://www.epa.gov/mrlc/;
NLCD http://www.epa.gov/mrlc/nlcd.html;
Riitters, et al. material http://www.srs.fs.usda.gov/4803/landscapes/

Indicator name: At-risk native forest species

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: What is the ecological condition of forests?

Spatial coverage: Natural Heritage programs in all 50 states.

Temporal coverage: 2000. Data managed consistently since 1974.

Characterization of supporting data set(s): NatureServe is an independent nonprofit organization whose research biologists gather, review, integrate, and record available information about species taxonomy, status, and use of different habitats or ecological system types. They are assisted in this work by scientists in the network of Natural Heritage programs as well as by contracted experts for different invertebrate taxa. NatureServe staff and collaborators assign a conservation status by using standard Heritage ranking criteria. The Heritage ranking process considers five major status ranks: critically imperiled (G1), imperiled (G2), vulnerable (G3), apparently secure (G4), and demonstrably widespread, abundant, and secure (G5). In addition, separate ranks are assigned for species regarded as presumed extinct (GX) or possibly extinct (GH).

Indicator derivation (project, program, organization, report): NatureServe and its member programs in the network of Natural Heritage programs develop and maintain information on species at risk. Presented in *The State of the Nation's Ecosystems*, pages 124 and 214 (The Heinz Center, 2002).

Web site: http://www.natureserve.org

Indicator name: Populations of representative forest species

Indicator type (status or trend): Status and Trend

Indicator Category: 2

Associated question: What is the ecological condition of forests?

Spatial coverage: National data for birds, 37 states for trees

Temporal coverage: 1970-2002. FIA data date from late 1940s to present. Data since 1953 provided with a reliability of ± 3-10 percent per 1 million acres (67 percent confidence limit). FIA provides updates of assessment data every five years. BBS was initiated in 1966.

Characterization of supporting data set(s): 1) *The North American Breeding Bird Survey (BBS)* is a long-term, large-scale international avian monitoring program intended to track the status and trends of North American bird populations. Today there are approximately 3700 active BBS routes across the continental U.S. and Canada of which 2900 are surveyed each year (Sauer, et al., 2001). 2) The USDA Forest Service Forest Inventory and Analysis (FIA) program is a survey-based program that has operated since the late 1940s, collecting information on a variety of forest characteristics. FIA has used a two-phase sample (generally, double sampling for stratification) to collect information on the nation's forests. Phase one establishes a large number of samples (more than 4 million, roughly every 0.6 miles). These are selected using aerial photographs or other remote-sensing images, which are then interpreted for various forest attributes. Phase two establishes a subset of approximately 450,000 phase-one points (roughly every 3 miles) for ground sampling. About 125,000 of these samples are permanently established on forest land. The forest characteristics measured include ownership, protection status, species composition, stand age and structure, tree growth, occurrences of mortality and removals, tree biomass, incidences of pathogens, natural and human-caused disturbances, and soil descriptors (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): Bird data are from the U.S. Geological Survey's *North American Breeding Bird Survey (BBS)*, and tree data are from the U.S. Forest Service, Draft Resource Planning and Assessment Tables, August 2002. Reported in U.S. Department of Agriculture. *National Report on Sustainable Forests - 2003, Final Draft*, Washington, DC: U.S. Department of Agriculture, Forest Service, 2002. This indicator was based on the final review draft of the Sustainable Forests report (USDA, FS, 2002) and the website for corresponding technical support material is provided below. The final version of the report and

supporting technical material will be found at
http://www.fs.fed.us/research/sustain/.

Web site: *Sustainable Forests Report*
http://www.fs.fed.us/research/sustain/data.htm (Indicator 9);
RPA tables http://www.ncrs.fs.fed.us/4801/FIADB/rpa_tabler/
Draft_RPA_2002_Forest_Resource_Tables.pdf;
BBS http://www.mp2-pwrc.usgs.gov/bbs/

Indicator name: Forest disturbance: fire, insects, and disease

Indicator type (status or trend): Trend

Indicator Category: 1

Associated question: What is the ecological condition of forests?

Spatial coverage: National, all 50 states

Temporal coverage: 1979-2000. FIA data date from late 1940s to
present. Data since 1953 provided with a reliability of ± 3-10 per-
cent per 1 million acres (67 percent confidence limit). FIA provides
updates of assessment data every five years.

Characterization of supporting data set(s): The USDA Forest
Service Forest Inventory and Analysis (FIA) program is a survey-
based program that has operated since the late 1940s, collecting
information on a variety of forest characteristics. FIA has used a two-
phase sample (generally, double sampling for stratification) to collect
information on the nation's forests. Phase one establishes a large
number of samples (more than 4 million, roughly every 0.6 miles).
These are selected using aerial photographs or other remote-sensing
images, which are then interpreted for various forest attributes.
Phase two establishes a subset of approximately 450,000 phase-one
points (roughly every 3 miles) for ground sampling. About 125,000
of these samples are permanently established on forest land. The
forest characteristics measured include ownership, protection status,
species composition, stand age and structure, tree growth,
occurrences of mortality and removals, tree biomass, incidences of
pathogens, natural and human-caused disturbances, and soil
descriptors (The Heinz Center, 2002). Data on insects and disease
are based on a probability sample that represents unbiased
estimates of both public and private forests in the U.S.

Indicator derivation (project, program, organization, report):
Data on fires are from 1) U.S. General Accounting Office. *Western
National Forests: Nearby Communities Are Increasingly Threatened by
Catastrophic Wildfires*, GAO/T-RCED-99-79. Washington, DC: U.S.
General Accounting Office, 1999 and 2) National Interagency Fire
Center. Wildland Fire Statistics. 2002. (May 2003;
http://www.nifc.gov/stats/wildlandfirestats.html).; data on insects
and disease are from Conkling, B., J. Coulston, and M. Ambrose
(eds.). *Forest Health Monitoring National Technical Report 1991-1999*,
Asheville, NC: U.S. Department of Agriculture Forest Service,
Southern Research Station, 2002. Presented in *The State of the
Nation's Ecosystems*, pages 127 and 242 (The Heinz Center, 2002).

Web site: *FHM* http://www.na.fs.fed.us/spfo/fhm/index.htm;
NIFC http://www.nifc.gov/stats/wildlandfirestats.html

Indicator name: Tree condition

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: What is the ecological condition of forests?

Spatial coverage: 32 states; more than half of the South and Rocky
Mountain regions had insufficient or no data.

Temporal coverage: 1990-1999

Characterization of supporting data set(s): Available national
data relates almost exclusively to trees, not the entire suite of forest
biota. Three metrics are used to determine tree condition: tree mor-
tality, tree crown condition, and fire condition class. National scale
data is lacking on many components of forest ecosystems. Available
data coverages are incomplete. Fundamental research linking biologi-
cal components to ecological processes is lacking (USFS, FS, 2002).

Indicator derivation (project, program, organization, report):
1) Conkling, B., J. Coulston and M. Ambrose (eds). *Forest Health
Monitoring National Technical Report, 1991-1999*. Asheville, NC:
USDA Forest Service, Forest Health Monitoring (FHM) Program,
Southern Research Station. 2002; 2) U.S. Department of
Agriculture. *National Report on Sustainable Forests - 2003, Final Draft*,
Washington, DC: U.S. Department of Agriculture, Forest Service,
2002. This indicator was based on the final review draft of the
Sustainable Forests report (USDA, FS, 2002) and the website for
corresponding technical support material is provided below. The final
version of the report and supporting technical material will be found
at http://www.fs.fed.us/research/sustain/.

Web site: *FHM* http://www.na.fs.fed.us/spfo/fhm/index.htm;
Sustainable Forest Report
http://www.fs.fed.us/ research/sustain/data.htm (Indicator 17)

Indicator name: Ozone injury to trees

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: What is the ecological condition of forests?

Spatial coverage: 32 states

Temporal coverage: 1994-2000

Characterization of supporting data set(s): The USDA Forest
Service Forest Health Monitoring (FHM) Program collects informa-
tion about ozone air quality on a network of biomonitoring plots
using ozone sensitive bioindicator plants (trees, woody shrubs, and
non-woody herb species). In 2000, there were 918 biomonitoring
sites in 32 states.

Indicator derivation (project, program, organization, report): 1) Conkling, B., J. Coulston, and M. Ambrose (eds.). *Forest Health Monitoring National Technical Report 1991-1999*, Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station, 2002; 2) U.S. Department of Agriculture. *National Report on Sustainable Forests - 2003, Final Draft*, Washington, DC: U.S. Department of Agriculture, Forest Service, 2002. This indicator was based on the final review draft of the Sustainable Forests report (USDA, FS, 2002) and the website for corresponding technical support material is provided below. The final version of the report and supporting technical material will be found at http://www.fs.fed.us/research/sustain/.

Web site: *Sustainable Forest Report* http://www.fs.fed.us/research/sustain/data.htm (Indicator 16); *FHM* http://www.na.fs.fed.us/spfo/fhm/index.htm

Indicator name: Carbon storage

Indicator type (status or trend): Trend

Indicator Category: 2

Associated question: What is the ecological condition of forests?

Spatial coverage: National. Data for Alaska and Hawaii are not included in this data series.

Temporal coverage: 1953-1996. Volume, area, and other forest characteristics are compiled in Smith, et al., 2001 for the years 1953, 1963, 1977, 1987, and 1997. The inventory years begin on the first calendar day of each year. More detailed data are available in databases for 1997 (USDA, FS, 2002).

Characterization of supporting data set(s): All carbon pools, with the exception of soil carbon, are estimated using USDA Forest Service Forest Inventory and Analysis (FIA) measured data or imputed data, along with inventory-to-carbon relationships, developed with information from ecological studies (USDA, 2003). Carbon storage is estimated by the FIA program using on-the ground measurements of tree trunk size from many forest sites and statistical models that show the relationship between trunk size and the weight of branches, leaves, coarse roots (>0.1 inch in diameter), and forest floor litter. Such data are combined with estimates of forest land area obtained from aerial photographs and satellite imagery. Forest floor litter includes all dead organic matter above the mineral soil horizons, including litter, humus, small twigs, and coarse woody debris (branches and logs greater than 1.0 inches in diameter lying on the forest floor). Note that there are 1.1 English tons per metric ton. In most international discussions, carbon storage is reported in metric tons.

Indicator derivation (project, program, organization, report): 1) Smith, W.B., J.S. Vissage, D.R. Darr, and R.M. Sheffield. *Forest Statistics of the United States, 1997*, General Technical Report NC-219. St. Paul, MN: U.S. Department of Agriculture Forest Service, North Central Research Station, 2001. 2) U.S. Department of Agriculture. *National Report on Sustainable Forests - 2003, Final Draft*,

Washington, DC: U.S. Department of Agriculture, Forest Service, 2002. This indicator was based on the final review draft of the Sustainable Forests report (USDA, FS, 2002) and the website for corresponding technical support material is provided below. The final version of the report and supporting technical material will be found at http://www.fs.fed.us/research/sustain/.

Web site: *FIA* http://fia.fs.fed.us; *Sustainable Forests Report* http://www.fs.fed.us/research/sustain/data.htm (primarily Indicator 27 with reference to Indicators 26 and 28)

Indicator name: Soil compaction

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: What is the ecological condition of forests?

Spatial coverage: 37 states (mostly east of the Mississippi, Rocky Mountains and Pacific Coast); STATSGO data are available for the conterminous U.S., Alaska, Hawaii, and Puerto Rico.

Temporal coverage: 1998-2000

Characterization of supporting data set(s):
1) Forest Health Monitoring (FHM) Program data collected on a representative sample of 2006 plots, a subset of the Forest Inventory Analysis (FIA) plot network (USDA, FS, 2003). The FIA soil indicator program is in the implementation phase and plots have not yet been established in all states. Analysis from the program is limited in scope. Data used for this indicator are based on visual inspection and state soil maps. No measurements were made regarding the intensity of compaction and physical disturbances that are not readily visible from the surface may be underreported. Compaction data from FIA/FHM are intended only to provide a "presence/absence" index of the occurrence of disturbed soils across the landscape (USDA, FS, 2003). 2) State Soil Geographic Database (STATSGO) consists of state general soil maps made by generalizing the detailed soil survey data. The level of mapping is designed to be used for broad planning and management uses covering state, regional, and multi-state areas. STATSGO data are designed for use in a Geographic Information System (GIS). The mapping scale for STATSGO map is 1:250,000 (with the exception of Alaska, which is 1:1,000,000). Each STATSGO map is linked to the Soil Interpretations Record (SIR) attribute data base. The attribute data base gives the proportionate extent of the component soils and their properties for each map unit. The STATSGO map units consist of 1 to 21 components each. The Soil Interpretations Record data base includes over 25 physical and chemical soil properties, interpretations, and productivity. Examples of information that can be queried from the data base are available water capacity, soil reaction, salinity, flooding, water table, bedrock, and interpretations for engineering uses, cropland, woodland, rangeland, pastureland, wildlife, and recreation development.

Indicator derivation (project, program, organization, report): 1) U.S. Department of Agriculture. *National Report on Sustainable Forests - 2003*, Washington, DC: U.S. Department of Agriculture, Forest Service, Forthcoming, 2003. This indicator was based on finalized portions of the forthcoming report referenced above that were provided to EPA for this report. The report, including technical support material for this indicator can be found at the website listed below. 2) STATSGO.

Web site: *Sustainable Forests Report* http://www.fs.fed.us/research/sustain/; *STATSGO* http://www.ftw.nrcs.usda.gov/stat_data.html

Indicator name: Soil erosion

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: What is the ecological condition of forests?

Spatial coverage: 37 states (mostly east of the Mississippi, Rocky Mountains and Pacific Coast); STATSGO data are available for the conterminous U.S., Alaska, Hawaii, and Puerto Rico.

Temporal coverage: 1998-2000

Characterization of supporting data set(s): 1) Forest Health Monitoring (FHM) Program measured erosion rates on plots and modeled the data using the Water Erosion Prediction Project (WEPP). Erosion estimates are limited by model assumptions and aggregate estimates of soil erosion often have little meaning in and of themselves due to natural variability in soil erosion (USDA, FS, 2003). 2) State Soil Geographic Database (STATSGO) consists of state general soil maps made by generalizing the detailed soil survey data. The level of mapping is designed to be used for broad planning and management uses covering state, regional, and multi-state areas. STATSGO data are designed for use in a Geographic Information System (GIS). The mapping scale for STATSGO map is 1:250,000 (with the exception of Alaska, which is 1:1,000,000). Each STATS-GO map is linked to the Soil Interpretations Record (SIR) attribute data base. The attribute data base gives the proportionate extent of the component soils and their properties for each map unit. The STATSGO map units consist of 1 to 21 components each. The Soil Interpretations Record data base includes over 25 physical and chemical soil properties, interpretations, and productivity. Examples of information that can be queried from the data base are available water capacity, soil reaction, salinity, flooding, water table, bedrock, and interpretations for engineering uses, cropland, woodland, rangeland, pastureland, wildlife, and recreation development.

Indicator derivation (project, program, organization, report): U.S. Department of Agriculture. *National Report on Sustainable Forests - 2003*, Washington, DC: U.S. Department of Agriculture, Forest Service, Forthcoming, 2003. This indicator was based on final-ized portions of the forthcoming report referenced above that were provided to EPA for this report. The report, including technical

support material for this indicator can be found at the website listed below. 2) STATSGO.

Web site: Sustainable Forests Report— http://www.fs.fed.us/research/sustain/; STATSGO— http://www.ftw.nrcs.usda.gov/stat_data.html

Indicator name: Processes beyond the range of historic variation

Indicator type (status or trend): Trend

Indicator category (1 or 2): 2

Associated question: What is the ecological condition of forests?

Spatial coverage: National

Temporal coverage: Effects during 1800-1850 (historic or baseline time period) were compared with the 1996-2000 (current time period) and beyond the range of recent variation (using data from the past 20-80 years) the effects of the recent past, e.g. 1979-1995, were compared with those during the current time period (USDA, FS, 2002).

Characterization of supporting data set(s): Primarily anecdotal data.

Indicator source (project, program, organization, report): U.S. Department of Agriculture. *National Report on Sustainable Forests - 2003, Final Draft*, Washington, DC: U.S. Department of Agriculture, Forest Service, 2002. This indicator was based on the final review draft of the Sustainable Forests report (USDA, FS, 2002) and the website for corresponding technical support material is provided below. The final version of the report and supporting technical material will be found at http://www.fs.fed.us/research/sustain/.

Web site: Sustainable Forests Report— http://www.fs.fed.us/research/sustain/data.htm (Indicator 15)

Farmlands

Indicator name: Pesticide leaching potential

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What is the ecological condition of farm-lands?

Spatial coverage: Agricultural lands covering 5.5 million hectares in six mid-Atlantic states

Temporal coverage: 1994 and 1995

Characterization of supporting data set(s): EPA's Environmental Monitoring and Assessment Program (EMAP) used the National Agricultural Statistics Service (NASS) probability area sampling frame in the Mid-Atlantic region to select 122 sites in 1994 and 152 sites in 1995. The sites were sampled during the NASS Fall Survey. Soil

samples and questionnaire data were collected from a random sample of 293 sites. Indicators addressed productivity, management at the agroecosystem scale, and management for the landscape scale on annual crop land. Crop yields were almost 30% higher than those of the 1980s, with a mean observed to expected yield index of 1.27. The mean soil quality index showed moderate quality for supporting plant growth. Non-tilled sites, which were mostly hay, had greater microbial biomass than tilled sites. Just over half of the annual crop land was covered by rotation plans; hay fields accounted for most of the land where one crop was grown continuously. Hay showed a lower use of applied nitrogen than seed crops. Integrated pest management was practiced on less than 20% of annual crop land. Twenty-seven different annual crops were grown in the region, with hay (all types) the dominant crop. Less than 20% of the land where pesticides were applied had high to moderately high potential for pesticides leaching into groundwater. This information provides a baseline for long-term monitoring of agricultural lands in the region (Hellkamp, et al. 2000).

Indicator source (project, program, organization, report): Hellkamp, A.S., J.M. Bay, C.L. Campbell, K.N. Easterling, D.A. Fiscus, G.R. Hess, B.F. McQuaid, M.J. Munster, G.L. Olson, S.L. Peck, S.R. Shafer, K. Sidik, and M.B. Tooley. Assessment of the condition of agricultural lands in six mid-Atlantic states. *Journal of Environmental Quality* 29: 79-804 (2000).

Web site: Paper abstract—
http://oaspub.epa.gov/emap/bib.print_abstract?pub_id_in=1284

Indicator name: Soil quality index

Indicator type (status or trend): Status

Indicator category (1 or 2): 2

Associated question: What is the ecological condition of farmlands?

Spatial coverage: Mid-Atlantic states

Temporal coverage: 1994-1995

Characterization of supporting data set(s): EPA's Environmental Monitoring and Assessment Program (EMAP) used the National Agricultural Statistics Service (NASS) probability area sampling frame in the Mid-Atlantic region to select 122 sites in 1994 and 152 sites in 1995. The sites were sampled during the NASS Fall Survey. Soil samples and questionnaire data were collected from a random sample of 293 sites. Indicators addressed productivity, management at the agroecosystem scale, and management for the landscape scale on annual crop land. Crop yields were almost 30% higher than those of the 1980s, with a mean observed to expected yield index of 1.27. The mean soil quality index showed moderate quality for supporting plant growth. Non-tilled sites, which were mostly hay, had greater microbial biomass than tilled sites. Just over half of the annual crop land was covered by rotation plans; hay fields accounted for most of the land where one crop was grown continuously. Hay showed a

lower use of applied nitrogen than seed crops. Integrated pest management was practiced on less than 20% of annual crop land. Twenty-seven different annual crops were grown in the region, with hay (all types) the dominant crop. Less than 20% of the land where pesticides were applied had high to moderately high potential for pesticides leaching into groundwater. This information provides a baseline for long-term monitoring of agricultural lands in the region (Hellkamp, et al. 2000).

Indicator source (project, program, organization, report): Data are available from the EPA Mid- Atlantic Integrated Assessment (MAIA) initiative and the index is described in Hellkamp, A.S., J.M. Bay, C.L. Campbell, K.N. Easterling, D.A. Fiscus, G.R. Hess, B.F. McQuaid, M.J. Munster, G.L. Olson, S.L. Peck, S.R. Shafer, K. Sidik, and M.B. Tooley. Assessment of the condition of agricultural lands in six mid-Atlantic states. *Journal of Environmental Quality* 29: 79-804 (2000).

Web site: *Paper abstract*
http://oaspub.epa.gov/emap/bib.print_abstract?pub_id_in=1284

Indicator name: Soil erosion

Indicator type (status or trend): Status

Indicator category: 2

Associated question: What is the ecological condition of farmlands?

Spatial coverage: National

Temporal coverage: At each Natural Resources Inventory (NRI) sample point, information is available for 1982, 1987, 1992, and 1997 so that trends and changes in land use and resource characteristics over 15 years can be examined and analyzed.

Characterization of supporting data set(s): 1) The NRI is a statistical sampling of over 800,000 locations to collect data on land cover and use, soil erosion, prime farmland soils, wetlands, habitat diversity, conservation practices, and related resource attributes on non-federal land in the U.S. 2) Soil erosion estimates were calculated using the USGS watersheds, NRI soils data, and the Universal Soil Loss Equation (Renard et al., 1997) and the Wind Erosion Equation (Bondy et al., 1980; Skidmore and Woodruff, 1968). 3) Soil parameters were obtained from the USDA Natural Resources Conservation Service (NRCS) soils database. The State Soil Geographic Database (STATSGO) consists of state general soil maps made by generalizing the detailed soil survey data. The level of mapping is designed to be used for broad planning and management uses covering state, regional, and multi-state areas. STATSGO data are designed for use in a Geographic Information System (GIS). The mapping scale for STATSGO map is 1:250,000 (with the exception of Alaska, which is 1:1,000,000). Each STATSGO map is linked to the Soil Interpretations Record (SIR) attribute data base. The attribute data base gives the proportionate extent of the component soils and their properties for each map unit. The STATSGO map units consist of 1 to 21 components each. The Soil Interpretations Record data

base includes over 25 physical and chemical soil properties, interpretations, and productivity. Examples of information that can be queried from the data base are available water capacity, soil reaction, salinity, flooding, water table, bedrock, and interpretations for engineering uses, cropland, woodland, rangeland, pastureland, wildlife, and recreation development.

Indicator derivation (project, program, organization, report): Data are from 1) USDA, NRCS STATSGO soils data and 2) USDA, NRCS NRI 1997 data (adjusted in 2000). Presented in *The State of the Nation's Ecosystems*, pages 100 and 235 (The Heinz Center, 2002).

Web site: *NRI* http://www.nrcs.usda.gov/technical/NRI/; *STATSGO* http://www.ftw.nrcs.usda.gov/stat_data.html

Grasslands and Shrublands

Indicator name: At-risk native grasslands and shrublands species

Indicator type (status or trend): Status

Indicator category: 2

Associated question: What is the ecological condition of grasslands and shrublands?

Spatial coverage: National

Spatial coverage: Natural Heritage programs in all 50 states.

Temporal coverage: 2000. Data managed consistently since 1974.

Characterization of supporting data set(s): NatureServe is an independent nonprofit organization whose research biologists gather, review, integrate, and record available information about species taxonomy, status, and use of different habitats or ecological system types. They are assisted in this work by scientists in the network of Natural Heritage programs as well as by contracted experts for different invertebrate taxa. NatureServe staff and collaborators assign a conservation status by using standard Heritage ranking criteria. The Heritage ranking process considers five major status ranks: critically imperiled (G1), imperiled (G2), vulnerable (G3), apparently secure (G4), and demonstrably widespread, abundant, and secure (G5). In addition, separate ranks are assigned for species regarded as presumed extinct (GX) or possibly extinct (GH).

Indicator derivation (project, program, organization, report): NatureServe and its member programs in the network of Natural Heritage programs develop and maintain information on species at risk. Presented in *The State of the Nation's Ecosystems*, pages 168 and 214 (The Heinz Center, 2002).

Web site: http://www.natureserve.org

Indicator name: Population trends in invasive and native non-invasive bird species

Indicator type (status or trend): Trend

Indicator category: 1

Associated question: What is the ecological condition of grasslands and shrublands?

Spatial coverage: National

Temporal coverage: Data were analyzed in seven 5-year intervals from 1966 to 2000.

Characterization of supporting data set(s): The North American Breeding Bird Survey (BBS) is a long- term, large-scale international avian monitoring program intended to track the status and trends of North American bird populations. Today there are approximately 3700 active BBS routes across the continental U.S. and Canada of which 2900 are surveyed each year (Sauer, et al., 2001).

Indicator derivation (project, program, organization, report): U.S. Geological Survey's Biological Resources Division, Breeding Bird Survey. Presented in *The State of the Nation's Ecosystems*, pages 170 and 262 (The Heinz Center, 2002).

Web site: *BBS* http://www.mbr-pwrc.usgs.gov/bbs/introbbs.html and http://www.mp2- pwrc.usgs.gov/bbs/; *Sauer, et al.* http://www.mbr-pwrc.usgs.gov/bbs/trend/tfmb.html

Urban and Suburban Lands

Indicator name: Patches of forest, grassland, shrubland, and wetland in urban/suburban areas

Indicator type (status or trend): Status

Indicator category: 2

Associated question: What is the ecological condition of urban and suburban areas?

Spatial coverage: Lower 48 states

Temporal coverage: 1992 satellite imagery

Characterization of supporting data set(s): NLCD provides a consistent, uniform, spatially explicit description of general land cover/land use across the continental U.S. at a 30-meter resolution. It does not contain habitat types. Eight of the 21 NLCD classifications were defined as "natural" for this analysis, including three classes of forest, three types considered grasslands/shrublands, and two wetlands types (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): Multi-Resolution Land Characterization Consortium (MRLC) - National Land Characterization Data (NLCD). Data analyses were undertaken by the U.S. Geological Survey's Earth Resources Observations Systems (EROS) Data Center. Presented in *The State of the Nation's Ecosystems*, pages 183 and 266 (The Heinz Center, 2002).

Web sites: *MRLC* http://www.epa.gov/mrlc/;
EROS Data Center "raw" data (requiring "considerable computing power" (The Heinz Center, 2002) http://edcwww.cr.usgs.gov/program/lccp/mrlcreg.html

Fresh Waters

Indicator name: Extent of ponds, lakes, and reservoirs

Indicator type (status or trend): Trend

Indicator category (1 or 2): 1

Associated question: What is the ecological condition of fresh waters?

Spatial coverage: Lower 48 states. Lake area does not include the Great Lakes, which cover about 60.2 million acres within the United States.

Temporal coverage: 1950s-1990s

Characterization of supporting data set(s): The U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) counts all lakes, reservoirs, and ponds regardless of land ownership. A permanent study design is used, based initially on stratification of the 48 conterminous states by state boundaries and 35 physiographic subdivisions. Within these subdivisions are 4375 randomly selected sample plots that are examined with the use of aerial imagery of varying scale and type. Ponds include the category of open- water ponds and non-vegetated palustrine wetlands (mud flats and shorelines of ponds) generally less than six feet deep and less than 20 acres in size. Lakes and reservoirs are generally larger than 20 acres and deeper than six feet (The Heinz Center, 2002).

Indicator source (project, program, organization, report): Data for lakes, reservoirs, and ponds come from 1) Dahl, T.E. *Status and Trends of Wetlands in the Conterminous United States 1986 to 1997*, Washington, DC: U.S. Department of the Interior, U.S. Fish and Wildlife Service, 2000; 2) Dahl, T.E., and C.E. Johnson. *Status and Trends of Wetlands in the Conterminous United States, Mid-1970's to Mid-1980's*, Washington, DC: U.S. Department of the Interior, U.S. Fish and Wildlife Service, 1991; 3) Frayer, W.E., T.J. Monahan, D.C. Bowden, and F.A. Graybill. *Status and Trends of Wetlands and Deepwater Habitats in the Conterminous United States, 1950's to 1970's*, Fort Collins, CO: Colorado State University, Department of Forest and Wood Sciences, 1983; and 4) unpublished data from the U.S. Fish and Wildlife Service (The Heinz Center, 2002). Presented in *The State of the Nation's Ecosystems*, pages 139 and 246 (The Heinz Center, 2002).

Web site: *Dahl, 2000*
http://wetlands.fws.gov/bha/SandT/ SandTReport.html

Indicator name: At-risk native fresh water species

Indicator type (status or trend): Status

Indicator category: 2

Associated question: What is the ecological condition of fresh waters?

Spatial coverage: Natural Heritage programs in all 50 states.

Temporal coverage: 2000. Data managed consistently since 1974.

Characterization of supporting data set(s): NatureServe is an independent nonprofit organization whose research biologists gather, review, integrate, and record available information about species taxonomy, status, and use of different habitats or ecological system types. They are assisted in this work by scientists in the network of Natural Heritage programs as well as by contracted experts for different invertebrate taxa. NatureServe staff and collaborators assign a conservation status by using standard Heritage ranking criteria. The Heritage ranking process considers five major status ranks: critically imperiled (G1), imperiled (G2), vulnerable (G3), apparently secure (G4), and demonstrably widespread, abundant, and secure (G5). In addition, separate ranks are assigned for species regarded as presumed extinct (GX) or possibly extinct (GH).

Indicator derivation (project, program, organization, report): NatureServe and its member programs in the network of Natural Heritage programs develop and maintain information on species at risk. Presented in *The State of the Nation's Ecosystems*, pages 144 and 214 (The Heinz Center, 2002).

Web site: http://www.natureserve.org/explorer

Indicator name: Non-native fresh water species

Indicator type (status or trend): Status

Indicator category: 2

Associated question: What is the condition of fresh waters?

Spatial coverage: Lower 48 states

Temporal coverage: 2000. An expansive spatial database underlies the Nonindigenous Aquatic Species (NAS) program, which was created in 1978 and continues to be updated and revised.

Characterization of supporting data set(s): Roughly 90 percent of the data in the U.S. Geological Survey's NAS database are derived from the published literature. Data are collected for the most part by federal and state biologists, although the public does contribute by reporting sightings (The Heinz Center, 2002). NAS is a repository for accurate and spatially referenced biogeographic accounts of nonindigenous aquatic species. Provided are scientific reports, online/realtime queries, spatial data sets, regional contact lists, and general information. The data is made available for use by biologists, interagency groups, and the general public.

Indicator derivation (project, program, organization, report): U.S. Geological Survey, Biological Resources Division (BRD), NAS Database. Presented in *The State of the Nation's Ecosystems*, pages 145 and 251 (The Heinz Center, 2002).

Web site: http://nas.er.usgs.gov/

Indicator name: Animal deaths and deformities

Indicator type (status or trend): Status

Indicator category: 2

Associated question: What is the ecological condition of fresh waters?

Spatial coverage: National. Database covers all 50 states, Puerto Rico, and the U.S. Virgin Islands

Temporal coverage: 1985-1999

Characterization of supporting data set(s): The National Wildlife Health Center (NWHC) maintains a database that contains wildlife disease and mortality events information on avian, mammalian, and amphibian mortality events. Information in the database is provided by various sources, such as state and federal personnel, diagnostic laboratories, wildlife refuges, and published reports (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): U.S. Geological Survey, Biological Resource Division (BRD), NWHC. Presented in *The State of the Nation's Ecosystems*, pages 146 and 252 (The Heinz Center, 2002).

Web site: http://www/mwhc.usgs.gov/pub_metadata/ qrt_mortality_report.html

Indicator name: At-risk fresh water plant communities

Indicator type (status or trend): Status

Indicator category: 2

Associated question: What is the ecological condition of fresh waters?

Spatial coverage: Natural Heritage programs in all 50 states, but this coverage excludes Alaska

Temporal coverage: 2000. Data managed consistently since 1974.

Characterization of supporting data set(s): NatureServe is an independent nonprofit organization whose research biologists gather, review, integrate, and record available information about species taxonomy, status, and use of different habitats or ecological system types. They are assisted in this work by scientists in the network of Natural Heritage programs as well as by contracted experts for different invertebrate taxa. NatureServe staff and collaborators assign a conservation status by using standard Heritage ranking criteria. The Heritage ranking process considers five major status ranks: critically imperiled (G1), imperiled (G2), vulnerable (G3), apparently secure (G4), and demonstrably widespread, abundant, and secure (G5). In addition, separate ranks are assigned for species regarded as presumed extinct (GX) or possibly extinct (GH).

Indicator derivation (project, program, organization, report): NatureServe and its member programs in the network of Natural Heritage programs develop and maintain information on species at risk. Presented in *The State of the Nation's Ecosystems*, 148 and 253 (The Heinz Center, 2002).

Web site: http://www.natureserve.org

Indicator name: Fish Index of Biotic Integrity (IBI) in streams

Indicator type (status or trend): Status

Indicator category: 2

Associated question: What is the ecological condition of fresh waters?

Spatial coverage: Statistically selected stream sites in the Mid-Atlantic Highlands (parts of Virginia, Maryland, Pennsylvania, and New York and all of West Virginia)

Temporal coverage: 1993-1994 sampling years

Characterization of supporting data set(s): About 450 stream reaches were sampled in the Mid-Atlantic Highlands. To describe the condition of all streams within the Highlands without sampling all of them EMAP worked with EPA Region 3 and the states to develop a regional statistical survey of streams. Examples of fish metrics measured were: the number of fish species present in the stream who cannot tolerate pollution; the proportion of individuals present that require clean gravel for spawning; and the number of bottom versus water column species present. Each metric was scored against the researchers expectations of what value was possible for each stream based on reference conditions.

Indicator derivation (project, program, organization, report): 1)Mid-Atlantic Integrated Assessment (MAIA), Environmental Monitoring and Assessment Program (EMAP), U.S. Environmental Protection Agency, *Mid-Atlantic Highlands Streams Assessment*, EPA/903/R-00/015, August 2000. 2) McCormick, F.H., R.M. Hughes, P.R. Kaufmann, D.V. Peck, J.L. Stoddard, and A.T. Herlihy. Development of an index of biotic integrity for the Mid-Atlantic Highlands Region. *Transactions of the American Fisheries Society* 130: 857-877 (2001).

Web site: *MAIA Report* http://www.epa.gov/maia/html/maha.html

Indicator name: Macroinvertebrate Biotic Integrity Index (MBII) for streams

Indicator type (status or trend): Status

Indicator category: 2

Associated question: What is the condition of fresh waters?

Spatial coverage: Statistically selected stream sites in the Mid-Atlantic Highlands (parts of Virginia, Maryland, Pennsylvania, and New York and all of West Virginia)

Temporal coverage: 1993-1994 sampling years

Characterization of supporting data set(s): About 450 stream reaches were sampled in the Mid-Atlantic Highlands. To describe the condition of all streams within the Highlands without sampling all of them EMAP worked with EPA Region 3 and the states to develop a regional statistical survey of streams. One aquatic insect index, EPT, has been used extensively to evaluate stream condition throughout the United States and was used in the Highlands. It is calculated from the number of species that are found in three orders of aquatic insects–mayflies (*Ephemeoptera*), stoneflies (*Plecoptera*), and caddisflies (*Trichoptera*) and gets its name from the first initials of these three orders (**EPT**). Many of the species in these three orders are sensitive to pollution and other stream disturbances, and the total number of species is a good gauge of how disturbed any given stream may be. EPT scores from least-disturbed Highland streams were used to set expectations. Expectations were set separately for streams with fast-moving sections or "riffles" (the vast majority of Highland streams) and slow-moving streams where "pools" dominate, because fewer EPT species naturally occur in pools.

Indicator derivation (project, program, organization, report): 1) Klemm, D.J., K.A. Blocksom, F.A. Fulk, A.T. Herlihy, R.M. Hughes, P.R. Kaufmann, D.V. Peck, J.L. Stoddard, W.T. Thoeny, M.B. Griffith, and W.S. Davis. Development and Evaluation of a Macroinvertebrate Biotic Integrity Index (MBII) for Regionally Assessing Mid-Atlantic Highlands Streams. *Environmental Management* 31(5): 656-669 (2003). 2) Mid-Atlantic Integrated Assessment (MAIA), Environmental Monitoring and Assessment Program (EMAP), U.S. Environmental Protection Agency, *Mid-Atlantic Highlands Streams Assessment*, EPA/903/R-00/015, August 2000.

Web site: *MAIA Report* http://www.epa.gov/maia/html/maha.html

Coasts and Oceans

Indicator name: Extent of estuaries and coastline

Indicator type (status or trend): Status

Indicator category (1 or 2): 1

Associated question: What is the ecological condition of coasts and oceans?

Spatial coverage: National, all 50 states and territories

Temporal coverage: 1996-1998

Characterization of supporting data set(s): Data were submitted by the states and territories to EPA's Office of Water which compiled a national report. Data were collected using different methodologies, definitions, and assumptions, so the data is unlikely to be consistent.

Indicator source (project, program, organization, report): U.S. Environmental Protection Agency, Office of Water, *2000 National*

Water Quality Inventory, EPA 841-R-02-001, August 2002, Table C-1 Total Estuarine and Ocean Shoreline Waters in the Nation.

Web site: http://www.epa.gov/305b/2000report/appendixc.pdf

Indicator name: Coastal living habitats

Indicator type (status or trend): Trend

Indicator category: 2

Associated question: What is the ecological condition of coasts and oceans?

Spatial coverage: National

Temporal coverage: 1950s to 1990s

Characterization of supporting data set(s): While data gaps are reported for the coral reef, seagrasses, and shellfish beds components of the indicator (The Heinz Center, 2002), the wetlands component is supported by U.S. Fish and Wildlife Service's (USFWS) recent report, *The Status and Trend of Wetlands in the Conterminous United States 1986-1997*. The report utilizes National Wetlands Inventory (NWI) and other wetland data. NWI counts all wetlands, regardless of land ownership, but recognizes only wetlands that are at least three acres. To ensure adequate coverage of coastal wetlands, supplemental sampling along the Atlantic and Gulf coast fringes was added (The Heinz Center, 2002).

Indicator source (project, program, organization, report): Dahl, T.E. *Status and Trends of Wetlands in the Conterminous United States 1986 to 1997*, Washington, DC: U.S. Department of the Interior, U.S. Fish and Wildlife Service, 2000. Presented in *The State of the Nation's Ecosystems*, pages 69 and 218 (The Heinz Center, 2002).

Web site: http://wetlands.fws.gov/bha/SandT/SandTReport.html

Indicator name: Shoreline types

Indicator type (status or trend): Status

Indicator category: 2

Associated question: What is the ecological condition of coasts and oceans?

Spatial coverage: National in scope; Pacific Northwest, Southern California, and South Atlantic regions only

Temporal coverage: 1984-2001

Characterization of supporting data set(s): Data were extracted from Environmental Sensitivity Index (ESI) atlases, a product of the National Oceanic and Atmospheric Administration's (NOAA), Office of Response and Restoration (ORR). The ESI method provides a standardized mapping approach for coastal geomorphology as well as biological and human use elements. Data from multiple atlases

were aggregated into the regions used. Some of the data atlases utilized were more than 15 years old (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): NOAA, ORR, Hazardous Materials Response Division, ESI atlases. Presented in *The State of the Nation's Ecosystems*, pages 70 and 219 (The Heinz Center, 2002).

Web site: *Some NOAA ESI data are available at* http://response.restoration.noaa.gov/esi/esiintro.html

Indicator name: Benthic Community Index

Indicator type (status or trend): Status

Indicator category: 2

Associated question: What is the ecological condition of coasts and oceans?

Spatial coverage: National in scope, 24 coastal states

Temporal coverage: Stations on the west coast were sampled in 1999. The entire U.S. coast, including the Gulf of Maine, was sampled in 2000.

Characterization of supporting data set(s): In 2000, EPA, NOAA, and USGS, in cooperation with all 24 U.S. coastal states, initiated the National Coastal Assessment. Using a compatible, probabilistic design and a common set of survey indicators, each state conducted the survey and independently assessed the condition of their coastal resources. While the complete assessment of national coastal waters is scheduled for publication in 2003, a preliminary assessment of selected estuaries was published by EPA in 2001. The EPA Environmental Monitoring and Assessment Program (EMAP) National Coastal Database contains estuarine and coastal data that EMAP and Regional-EMAP have collected since 1990 from hundreds of stations between Cape Cod and the Mexican border. These include water column data, sediment chemistry and toxicity data, demersal fish and invertebrate community and contaminant data and benthic invertebrate community data.

Indicator derivation (project, program, organization, report): 1) EMAP National Coastal Database; 2) U.S. Environmental Protection Agency. *National Coastal Condition Report*, EPA 620-R-01-005. Washington DC: U.S. Environmental Protection Agency, Office of Research and Development and Office of Water, September 2001.

Web site: *NCCR* http://epa.gov/owow/oceans/nccr/downloads.html; *National Coastal Database* http://www.epa.gov/emap/nca/html/data/index.html

Indicator name: Fish diversity

Indicator type (status or trend): Status

Indicator category: 2

Associated question: What is the ecological condition of coasts and oceans?

Spatial coverage: Mid-Atlantic estuaries

Temporal coverage: 1997-1998

Characterization of supporting data set(s): The EPA Mid-Atlantic Integrated Assessment (MAIA) Estuaries Summary Database contains water quality, sediment, benthic community, and fish data collected by several partners in MAIA Region estuaries in 1997 and 1998. The MAIA program conducted regular fish surveys during the summer of 1998 to characterize the structure and health of the fish communities. The stations sampled were selected according to a probabilistic design. These stations were not identical with the stations sampled for water and sediment quality analyses conducted primarily in 1997; therefore, it is not possible to directly compare these different analyses station by station. However, it is statistically valid to compare results among classes of estuaries, (e.g., large versus small estuaries, Delaware Estuary versus Chesapeake Estuary).

Indicator source (project, program, organization, report): U.S. Environmental Protection Agency. *Mid- Atlantic Integrated Assessment, MAIA - Estuaries 1997-98, Summary Report*, EPA 620-R-02-003. Narragansett, RI: U.S. Environmental Protection Agency, Office of Research and Development, Atlantic Ecology Division, May 2003.

Web site: *MAIA data* http://www.epa.gov/emap/maia/html/data/ estuary/9798/xport.html

Indicator name: Submerged aquatic vegetation

Indicator type (status or trend): Status

Indicator category: 2

Associated question: What is the ecological condition of coasts and oceans?

Spatial coverage: Mid-Atlantic estuaries, Chesapeake Bay

Temporal coverage: 1985-1998

Characterization of supporting data set(s): The Chesapeake Bay Program's second submerged aquatic vegetation (SAV) Technical Synthesis revises and updates the first synthesis published in 1992, by providing new light requirements for SAV through the water column and at the leaf surface, providing diagnostic tools for their application and interpretation, and identifying preliminary sets of physical, chemical, and other biological habitat requirements. An algorithm was applied to analyze SAV habitat suitability for some 50 sites in Chesapeake Bay and its tidal tributaries using data collected over 14 years (1985-1998) of environmental monitoring (EPA, CBP, 2000). 2) Mid-Atlantic Integrated Assessment (MAIA) field crews noted the presence or absence of SAV at their sampling stations as an ancillary measurement. No attempt was made to estimate the extent of SAV the MAIA region. The MAIA database contains water quality, sediment, benthic community, and fish data collected by

several partners in MAIA Region estuaries in 1997 and 1998. The MAIA program conducted regular fish surveys during the summer of 1998 to characterize the structure and health of the fish communities. The stations sampled were selected according to a probabilistic design. These stations were not identical with the stations sampled for water and sediment quality analyses conducted primarily in 1997; therefore, it is not possible to directly compare these different analyses station by station. However, it is statistically valid to compare results among classes of estuaries, (e.g., large versus small estuaries, Delaware Estuary versus Chesapeake Estuary).

Indicator source (project, program, organization, report): 1) Batiuk, R.A., P. Bergstrom, M. Kemp, E. Koch, L. Murray, J.C. Stevenson, R. Bartleson, V. Carter, N.B. Rybicki, J.M. Landwehr, C. Gallegos, L. Karrh, M. Naylor, D. Wilcox, K.A. Moore, S. Ailstock, and M. Teichberg. *Chesapeake Bay Submerged Aquatic Vegetation Water Quality and Habitat-Based Requirements and Restoration Targets: A Second Technical Synthesis*, CBP-TRS 245-00, EPA 903-R-00-014. Annapolis, MD: U.S. Environmental Protection Agency, Chesapeake Bay Program, 2000; 2) U.S. Environmental Protection Agency. *Mid-Atlantic Integrated Assessment, MAIA - Estuaries 1997-98, Summary Report*, EPA 620-R-02-003. Narragansett, RI: U.S. Environmental Protection Agency, Office of Research and Development, Atlantic Ecology Division, May 2003.

Web site: *CBP report* http://www.chesapeakebay.net/pubs/ sav/index.html

Indicator name: Fish abnormalities

Indicator type (status or trend): Status

Indicator category: 2

Associated question: What is the ecological condition of coasts and oceans?

Spatial coverage: National assessment, data presented for Gulf of Mexico to Cape Cod, Great Lakes excluded

Temporal coverage: Data collected in 2000, available in 2002 for Pacific Coast

Characterization of supporting data set(s): U.S. Environmental Protection Agency Environmental Monitoring and Assessment Program (EMAP) data on fish pathologies by estuarine province.

Indicator source (project, program, organization, report): U.S. Environmental Protection Agency. *National Coastal Condition Report*, EPA 620-R-01-005. Washington DC: U.S. Environmental Protection Agency, Office of Research and Development and Office of Water, September 2001.

Web site: *NCCR* http://epa.gov/owow/oceans/nccr/downloads.html

Indicator name: Unusual marine mortalities

Indicator type (status or trend): Status

Indicator category: 2

Associated question: What is the ecological condition of coasts and oceans?

Spatial coverage: National in scope for marine mammals

Temporal coverage: 1992-2001

Characterization of supporting data set(s): Data is available for whales, dolphins, porpoises, seals, sea lions, sea otters, and manatees. Data is not available for turtle, seabird, fish, and shellfish mortality. The 2001 data for two unusual mortality events and the total number of gray whales lost in the 1999-2001 unusual mortality event were obtained directly from National Marine Fisheries Service (NMFS). All other unusual mortality event data were obtained from Dierauf and Gulland, (2001) (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): 1) U.S. Department of Commerce, NOAA, NMFS, Office of Protected Resources, Marine Mammal Health and Stranding Response Program; 2) Dierauf, L.A., and F.M.D. Gulland (eds.) *CRC Handbook of Marine Mammal Medicine: Health, Disease, and Rehabilitation, 2nd Edition*, Boca Raton, FL: CRC Press, Inc., 2001. Presented in *The State of the Nation's Ecosystems*, pages 77 and 223 (The Heinz Center, 2002).

Web site: *NMFS data* http://www.nmfs.noaa.gov/prot_res/PR2/Health_and_Stranding_ Response_Program/WGUMMME.html

The Entire Nation

Indicator name: Ecosystem extent

Indicator type (status or trend): Status and Trend

Indicator category (1 or 2): 2

Associated question: What is the ecological condition of the entire nation?

Spatial coverage: National in all cases

Temporal coverage: 1950s-1990s.

Characterization of supporting data set(s): 1) For cropland, the data source is the USDA Economic Research Service (ERS) relying on data from the National Agricultural Statistics Service and a variety of other sources to provide an estimate of extent. 2) For forests, the data source is the USDA Forest Service Forest Inventory and Analysis (FIA) program, a survey-based program that has operated since the late 1940s, collecting information on a variety of forest characteristics. 3) For fresh water wetlands, the data source is the U.S. Fish and Wildlife Service's National Wetlands Inventory as reported in the most recent wetlands status and trends report (Dahl, 2000). 4) For grasslands and shrublands, the data source is the National Land Cover Dataset (NLCD). In the 1990s, a federal interagency consortium (the Multi- Resolution Land Characterization (MRLC) Consortium) was created to coordinate access to and use of land

cover data from the Landsat 5 Thematic Mapper. Using Landsat data and a variety of ancillary data, the consortium processed data from a series of 1992 Landsat images, to create the NLCD on a square grid covering the lower 48 states. The MRLC NLCD with 21 land cover classes, was used to estimate the area coverage for the U.S. 5) For urban/suburban, the data source is the NLCD.

Indicator derivation (project, program, organization, report): 1) ERS; 2) FIA; 3) Dahl, T.E. *Status and Trends of Wetlands in the Conterminous United States 1986 to 1997*, Washington, DC: U.S. Department of the Interior, U.S. Fish and Wildlife Service, 2000; 4) NLCD; 5) NLCD. Presented in *The State of the Nation's Ecosystems*, pages 41-43 and 207 (The Heinz Center, 2002).

Web site: *ERS* http://www.ers.usda.gov/Emphases/Harmony/issues/arei2000/; *FIA* http://fia.fs.fed.us; *Dahl, 2000* http://wetlands.fws.gov/bha/SandT/SandTReport.html; *NLCD* http://www.usgs.gov/mrlcreg.html

Indicator name: At-risk native species

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: What is the ecological condition of the entire nation?

Spatial coverage: Natural Heritage programs in all 50 states.

Temporal coverage: 2000. Data managed consistently since 1974.

Characterization of supporting data set(s): NatureServe is an independent nonprofit organization whose research biologists gather, review, integrate, and record available information about species taxonomy, status, and use of different habitats or ecological system types. They are assisted in this work by scientists in the network of Natural Heritage programs as well as by contracted experts for different invertebrate taxa. NatureServe staff and collaborators assign a conservation status by using standard Heritage ranking criteria. The Heritage ranking process considers five major status ranks: critically imperiled (G1), imperiled (G2), vulnerable (G3), apparently secure (G4), and demonstrably widespread, abundant, and secure (G5). In addition, separate ranks are assigned for species regarded as presumed extinct (GX) or possibly extinct (GH).

Indicator derivation (project, program, organization, report): NatureServe and its member programs in the network of Natural Heritage programs develop and maintain information on species at risk. Presented in *The State of the Nation's Ecosystems*, pages 52-53 and 214 (The Heinz Center, 2002).

Web site: http://www.natureserve.org

Indicator name: Bird Community Index

Indicator type (status or trend): Status

Indicator Category: 2

Associated question: What is the ecological condition of the entire nation?

Spatial coverage: Mid-Atlantic Highlands (parts of Virginia, Maryland, Pennsylvania, and New York and all of West Virginia)

Temporal coverage: 1995-1996 data

Characterization of supporting data set(s): Birds and vegetation were surveyed across the entire Mid-Atlantic highlands within sites sufficiently large (200 acres) to represent most of the habitat elements that are required by breeding birds. Use of EPA's Environmental Monitoring and Assessment Program (EMAP) survey design guaranteed that data from the 126 sample sites were representative of the entire highlands area. Sixteen specific groups of bird species, such as omnivores, bark probers, residents, migrants, shrub nesters, etc., were ultimately selected as representative of the mostly forested Mid-Atlantic Highlands area. Of the 16 groups, nine were "specialists" and seven were "generalists"; for example, insectivores are specialists and omnivores are generalists. Placement of specific bird species within each group was based on a review of scientific publications. Species may be assigned to several groups as well as to both specialist and generalist groups simultaneously. In general, a high proportion of birds with specialized requirements indicates healthy natural habitat that provides ecological benefits at local and larger scales (EPA, 2000).

Indicator derivation (project, program, organization, report): 1) O'Connell, T.J., L.E. Jackson, and R.P. Brooks. Bird guilds as indicators of ecological condition in the central Appalachians. *Ecological Applications* 10: 1706-1721 (2000). 2) U.S. Environmental Protection Agency. *MAIA Project Summary: Birds Indicate Ecological Condition of the Mid-Atlantic Highlands*. EPA 620-R-000-003. Washington, DC: EPA, Office of Research and Development, June 2000.

Web site: *MAIA summary* http://www.epa.gov/maia/html/bird.htm; *Full research report* http://www.wetlands.cas.psu.edu

Indicator name: Terrestrial Plant Growth Index

Indicator type (status or trend): Status and Trend

Indicator Category: 1

Associated question: What is the ecological condition of the entire nation?

Spatial coverage: Lower 48 states

Temporal coverage: 1989-2000, except for 1994 when the satellite failed. The Normalized Difference Vegetation Index (NDVI) is calculated at two-week intervals and summed throughout the growing season; only values that exceed non-growing-season, background NDVI are included. Growing season dates, end dates, and back-

ground NDVI were calculated for each land cover type and region (The Heinz Center, 2002).

Characterization of supporting data set(s): The plant growth index is based on data collected by the Advanced Very High Radiation Radiometer (AVHRR) aboard NOAA's polar orbiting satellites. Because the relationship between NDVI and absorbed photosynthetically active radiation varies by cover type, the growing season accumulated NDVI was calculated separately for the forest, farmland, and grassland/shrubland areas in each county of the conterminous 48 states. The 11-year average growing- season accumulated NDVI was also calculated for each of the three land cover types in each county. The values in each county segment for each year were then normalized by using the corresponding 11-year average for that county segment to produce a plant growth index where a value of 1.0 equals the long-term average. Areas with plant growth indices greater than 1.0 have higher-than-average accumulated NDVI; within the same cover type and in an area as small as a county, this implies higher-than-average plant growth for that year. The regional and system specific plant growth indices are the area-weighted averages of the segments contained within the region and system (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): Data on accumulated NDVI and analysis of those data are from the USGS's Earth Resources Observations Systems (EROS) Data Center, Sioux Falls, South Dakota. Presented in *The State of the Nation's Ecosystems*, pages 56-57 and 216 (The Heinz Center, 2002).

Web site: http://edcwww.cr.usgs.gov/

Indicator name: Movement of nitrogen

Indicator type (status or trend): Status

Indicator Category: 1

Associated question: What is the ecological condition of the entire nation?

Spatial coverage: Lower 48 states

Temporal coverage: 1996-1999

Characterization of supporting data set(s): Riverine loads of total nitrogen were estimated using streamflow and water-quality data collected by the U.S. Geological Survey as part of its National Stream Water Accounting Network (NASQAN), its 1996-1999 National Water Quality Assessment (NAWQA), and its Federal State Cooperative Program. At the sites for which data are included in this indicator, samples were collected at least quarterly over the four-year period and at most sites, approximately 15 samples were collected each year. A regression model relating nitrogen concentration to discharge, day- of-year (to capture seasonal effects), and time (to capture any trend over the period) was developed. Another model was developed for nitrate plus nitrite concentrations (note that nitrite is usually much less abundant than nitrate, so it is normal to

discuss the sum of nitrate plus nitrite simply as nitrate) and a third model was developed for whole-water organic nitrogen plus ammonia for each station. These models were then used to make daily estimates of concentration, which were multiplied by the daily average discharge to yield the daily load. The daily load of total nitrogen was the sum of predictions of the latter two models (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): USGS, NASQAN and NAWQA programs, and the USGS Federal-State Cooperative Program. Presented in *The State of the Nation's Ecosystems*, pages 46-47 and 210 (The Heinz Center, 2002).

Web site: *NASQAN* http://water.usgs.gov/nasqan; *NAWQA* http://water.usgs.gov/nawqa

Indicator name: Chemical contamination

Indicator type (status or trend): Trend

Indicator Category: 2

Associated question: What is the ecological condition of the entire nation?

Spatial coverage: Lower 48 states

Temporal coverage: 1990-1997 (EMAP) and 1992-1998 (USGS)

Characterization of supporting data set(s): 1) The data for fresh-water streams and ground water were collected and analyzed by the U.S. Geological Survey's (USGS), National Water Quality Assessment (NAWQA) in 36 major river basins and aquifers across the U.S. 2) The data for sediments and fish contamination in coastal waters were collected and analyzed by the U.S. Environmental Protection Agency's, Environmental Monitoring and Assessment Program (EMAP) in a manner that allows conclusions to be drawn concerning the majority (approximately 76 percent) of the areas of estuaries in the U.S. 3) Data on sediment contamination in the Great Lakes are collected by a number of agencies and were provided by EPA's Great Lakes National Program Office (The Heinz Center, 2002).

Indicator derivation (project, program, organization, report): 1) USGS, NAWQA; 2) EPA, EMAP; and 3) Great Lakes National Program Office. Presented in *The State of the Nation's Ecosystems*, pages 48-51 and 210 (The Heinz Center, 2002).

Web site: *NAWQA* http://water.usgs.gov/nawqa; *EMAP* http://www.epa.gov/emap/